

**THE MINERAL INDUSTRY IN KANSAS
IN 1959**

**By
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ABSTRACT

Mineral production in Kansas in 1959 exceeded \$500,000,000 for the fourth consecutive year. Total value of all minerals produced or processed in the state was \$524,634,619, an increase of 2.6 percent from 1958. Of the total, \$442,788,460 or 84.39 percent came from sale of mineral fuels and associated products, \$81,501,619 or 15.54 percent was contributed by the nonmetals excluding mineral fuels, and \$344,540 or 0.65 percent by the metals. Production and value of coal, helium, natural gasoline, LP gases, oil or petroleum, and zinc in 1959 were each less than in 1958; all other mineral commodities showed increases.

Again 3 of the 105 counties in Kansas reported no mineral production in 1959; Mitchell County joined the producing counties but Ottawa County reported no mineral production in 1959. Oil, gas, or both were produced in 82 counties, sand and gravel in at least 71 counties, and stone in 41 counties. In 1959 each of 59 counties, 5 more than in 1958, produced minerals worth \$1,000,000 or more. Barton County again led in the value of mineral production (\$34,775,252), followed by Ellis County (\$33,391,076) and Russell County (\$27,216,157). Butler, Grant, and Graham Counties also each produced minerals worth more than \$20,000,000. In the \$10,000,000 to \$20,000,000 category were 13 counties, one more than in 1958. Only seven of the counties producing \$1,000,000 or more in mineral wealth in 1959 produced mainly nonfuel minerals, and six of these are in eastern Kansas. The counties that produced the greatest dollar value of minerals are those in which oil is found, mainly western Kansas counties, although Allen, Butler, and Greenwood Counties, all in eastern Kansas, are included in the list. Counties that exploited the most different minerals were Cherokee and Reno, seven minerals each, and Barber, Grant, Kearny, Kingman, and Sedgwick, six minerals each. The minerals that led in value were oil, natural gas, portland cement, stone, salt, clay and clay products, carbon black, butane, and coal. This report gives the amount and value of all minerals produced in the state in 1959 and compares them with 1958 statistics, and it also includes directories of mineral producers on record as of December 31, 1959. A brief summary of mineral production, value, and trends in Kansas for the 1950-59 decade concludes the report.

INTRODUCTION

Mineral production in Kansas in 1959 exceeded \$500,000,000 for the fourth consecutive year. Total value of all minerals produced or processed in the state was \$524,634,619 or \$10,400,174 more than in 1958, an increase of 2.6 percent. Since 1932 Kansas has ranked among the first ten states in the value of mineral commodities produced annually. Within the state 22 minerals are produced commercially, 5 others are available but currently are not exploited, at least 6 others are known to occur but have

TABLE 1.—Quantity and value of Kansas mineral production, by commodities, 1958 and 1959.

Commodity	Unit	1958		1959		1959 Rank
		Quantity	Value	Quantity	Value	
Carbon black	Pound	75,443,750	\$ 5,261,142	91,644,160	\$ 6,387,598	8
Cement (masonry)	376-lb. bbl.	320,270	1,204,594	349,265	1,393,350	14
Cement (natural)	do	*	*	*	*	19
Cement (portland)	do	9,298,427	28,843,139	10,055,944	30,889,337	3
Clay (raw)	Short ton	875,441	1,144,983	1,020,560	1,270,341	16
Clay and clay products	do	830,329	10,500,000	774,360	11,500,000	6
Coal	do	*	3,818,042	*	3,491,700	10
Diatomaceous marl	do	*	*	*	*	24
Gypsum (crude)	do	*	*	*	*	15
Helium—shipments	Cu. ft.	27,888,000	432,264	21,642,500	342,619	17
Lead (recoverable content of ores)	Short ton	1,299	303,966	481	110,630	20
Natural gas	M cu. ft.	535,937,434	58,953,118	595,244,836	65,476,932	2
Natural gas liquids						
Butane	42-gal. bbl.	993,269	1,539,567	1,507,175	3,112,280	12
Natural gasoline	do	2,600,607	6,007,402	2,554,365	5,900,583	9
LPG	do	404,027	626,242	55,848	86,564	21
Propane	do	1,363,436	2,113,326	1,426,595	3,152,775	11
Perlite ^a	Short ton	*	*	*	*	23
Petroleum (crude)	42-gal. bbl.	119,942,094	362,225,124	119,473,875	354,837,409	1
Pumicite (volcanic ash)	Short ton	*	*	*	*	26
Salt (brine)	do	*	*	*	*	13
Salt (common)	do	867,924	9,827,759	899,252	11,687,446	5
Sand and gravel	do	10,578,668	7,044,966	11,334,128	7,937,205	7
Sandstone (dimension)	do	*	*	*	*	25
Stone (limestone, sandstone, chat)	do	12,505,060 ^c	15,039,385 ^c	13,987,952	17,072,506	4
Vermiculite ^a	do	*	*	*	*	22
Zinc (recoverable content of ores, etc.)	do	4,421	901,884	1,017	233,910	18
* Undistributed			2,056,660		4,152,905	
Total value			\$514,234,445 ^b		\$524,634,619 ^b	

^a Minerals processed but not mined in Kansas.

^b Totals adjusted to eliminate duplication in the value of clays and stone.

^c Excludes sandstone, value of which is included under "Undistributed".

* Quantity and value of individual commodities cannot be revealed.

not been studied sufficiently to determine their commercial possibilities, and at least 2 minerals are processed into useful mineral commodities from raw materials shipped into the state. Table 1 presents data on mineral production in Kansas for 1958 and 1959, together with the 1959 rank of each mineral with respect to the other minerals produced in the state.

Minerals are widely distributed in the state; oil, gas, or both were produced in 82 counties, 4 more than in the previous year; sand and gravel were obtained in at least 71 counties instead of 70 as in 1958; and stone in 41 counties, 5 fewer than in 1958. Coal is being mined in 7 eastern counties. Salt and gypsum, known to underlie at least 40 central and southwestern counties, are currently being produced in only 6 counties.

Of the 105 counties in Kansas, all but 3 (Greeley, Lane, and Ottawa) reported mineral production in 1959, the same as in 1958. In 1958, however, Mitchell County was one of the three nonproducing counties, rather than Ottawa County. In 1959, each of 59 counties, 5 more than in 1958, produced minerals worth \$1,000,000 or more. Barton County, as in previous years, led with \$34,775,252, followed by Ellis County with \$33,391,076. Russell County (\$27,216,157) again was third, and was followed by Butler County (\$23,808,817), Grant County (\$21,484,291), and Graham County (somewhat more than \$20,460,398) in the \$20,000,000 to \$30,000,000 category. Counties producing in 1959 mineral wealth valued between \$10,000,000 and \$20,000,000 were in order of rank Greenwood, Stafford, Rooks, Rice, Morton, Sedgwick, Reno, Allen, Cowley, Barber, Kingman, Stevens, and McPherson. Table 2 summarizes the range of value of the 1958 and 1959 mineral production per county.

Counties that produced the greatest dollar value of minerals (\$10,000,000 or more) are those in which oil is found. Most of

TABLE 2.—Range of value of 1958 and 1959 mineral production per county

Value of annual production, millions of dollars	Number of counties producing minerals valued in this range	
	1958	1959
30-40	2	2
20-30	3	4
10-20	13	14
1-10	36	39
0- 1	48	43
No production	3	3

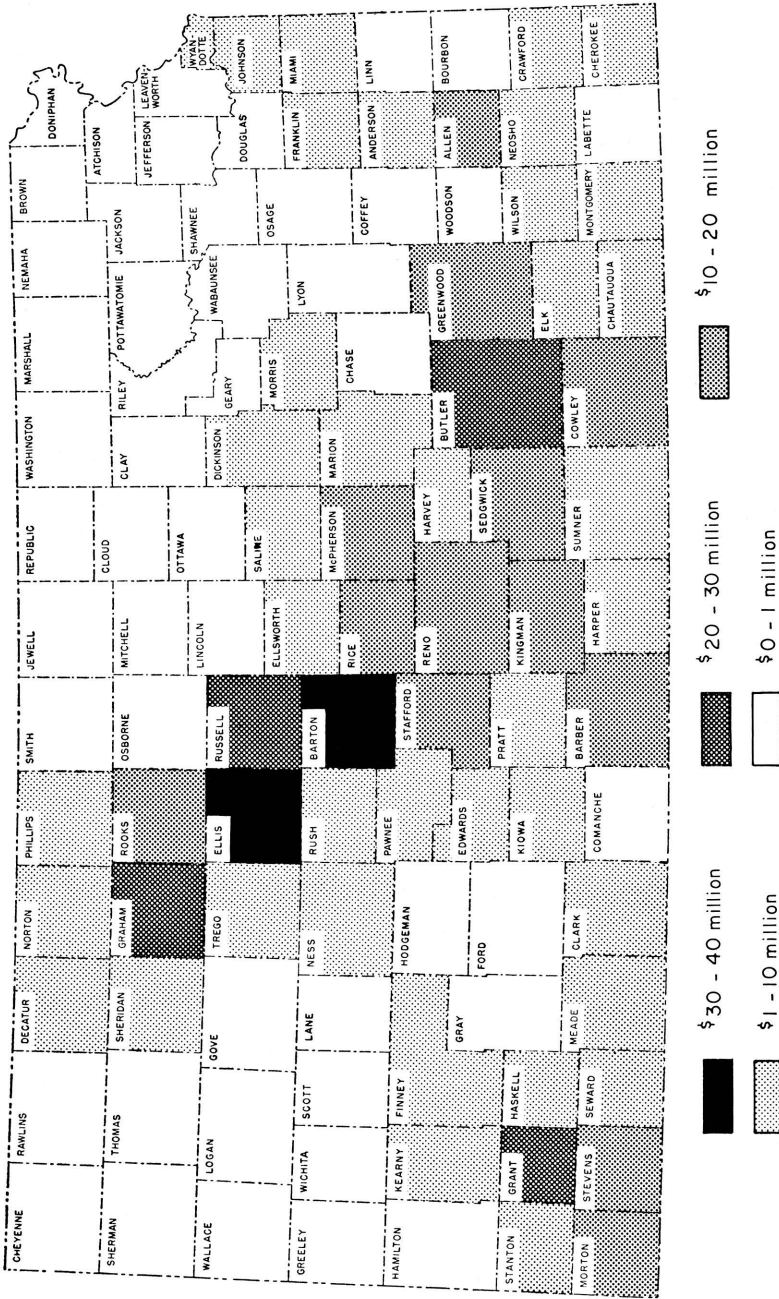


Fig. 2—Map of Kansas showing range of value of 1959 mineral production by county.

these are western counties, but Allen, Butler, and Greenwood, all eastern counties, are included. Seven of the 59 counties producing \$1,000,000 or more in mineral wealth in 1959 produced mainly nonfuel minerals, and six of these are eastern counties, Allen, Dickinson, Johnson, Montgomery, Neosho, and Wyandotte; Reno is the only western county. Elk and Wilson Counties' mineral wealth is about equally divided between fuel and nonfuel minerals. Counties that exploited the most different minerals were Cherokee and Reno (seven minerals) and Barber, Grant, Kearny, Kingman, and Sedgwick (six each); of these only Cherokee produced no oil (Fig. 1). A summary evaluation of mineral fuels and nonfuel minerals for Kansas counties in 1959 is presented in Table 3 and Figure 2.

TABLE 3.—*Value of mineral production in Kansas, by county, in 1959*

County	Value of mineral production			Commodities ^b in order of decreasing value
	Fuels ^a	Nonfuels	Total	
Allen	\$ 2,685,404	\$ 10,075,562	\$ 12,760,966	C, O, St, Cl, G
Anderson	1,352,881	75,638	1,428,519	O, St, SG
Atchison	....	330,563	330,563	St
Barber	11,057,807	*	*	G, O, Gp, NG, Pr, SG
Barton	34,440,153	335,099	34,775,252	O, SG, Cl, G
Bourbon	98,998	657,386	756,384	St, NC, C, O, Co, G
Brown	....	*	*	SG
Butler	23,550,217	258,600	23,808,817	O, St
Chase	340,653	*	*	O, St, SG, G
Chautauqua	2,719,744	124,125	2,843,869	O, St, G, SG
Cherokee	2,178,621	625,742	2,804,363	Co, St, Zn, Pb, Cl, SG, G
Cheyenne	45,926	13,210	59,136	O, SG
Clark	1,343,206	18,750	1,361,956	G, O, SG
Clay	43,371	114,869	158,240	SG, O, St
Cloud	....	285,564	285,564	Cl, SG
Coffey	300,870	62,069	362,939	O, St, Co, SG, G
Comanche	81,938	7,687	89,625	O, SG, G
Cowley	11,759,169	660,469	12,419,638	O, St, SG, G
Crawford	1,346,317	*	*	Co, Cl, O, St, G
Decatur	1,089,526	20,616	1,110,142	O, SG
Dickinson	224,381	1,108,891	1,333,272	St, O, SG
Doniphan	....	342,222	342,222	St
Douglas	73,396	60,381	133,777	O, SG, St
Edwards	2,217,211	6,260	2,223,471	O, G, SG
Elk	774,661	*	*	St, O, G, SG
Ellis	33,331,282	59,794	33,391,076	O, St, SG
Ellsworth	6,428,754	1,025,833	7,454,587	O, S, Cl, SG
Finney	8,495,291	44,331	8,539,622	G, O, NG, SG
Ford	34,565	98,750	133,315	SG, G, O
Franklin	816,162	223,302	1,039,464	O, Cl, St, Co
Geary	....	642,357	642,357	St, SG
Gove	38,212	11,234	49,446	O, SG
Graham	20,460,398	*	*	O, SG
Grant	21,484,291	....	21,484,291	G, CB, NG, Bu, Pr, O
Gray	....	*	*	SG

TABLE 3.—Value of mineral production in Kansas, by county, in 1959
(continued)

County	Value of mineral production			Commodities ^b in order of decreasing value
	Fuels ^a	Nonfuels	Total	
Greeley	....	....	....	....
Greenwood	17,592,074	151,332	17,743,406	O, St, SG
Hamilton	515,737	47,874	563,611	G, SG, O
Harper	4,057,045	23,027	4,080,072	O, G, SG
Harvey	1,173,180	....	1,173,180	O, G
Haskell	5,862,397	*	*	G, O, NG, SG
Hodgeman	892,162	....	892,162	O
Jackson	....	98,747	98,747	St, SG
Jefferson	....	486,750	486,750	St
Jewell	....	*	*	St
Johnson	15,382	993,047	1,008,429	St, O, G
Kearny	8,410,568	40,692	8,451,260	G, NG, O, SG, Pr, LP
Kingman	11,510,222	*	*	O, G, NG, Pr, Bu, SG
Kiowa	2,758,238	30,145	2,788,383	O, G, SG
Labette	324,930	*	*	O, St, G
Lane	....	....	....	....
Leavenworth	5,855	573,562	579,417	St, SG, O, G
Lincoln	....	503,665	503,665	St, SG, P
Linn	202,901	172,161	375,062	O, St, Co, SG, G
Logan	1,936	....	1,936	O
Lyon	544,200	*	*	O, SG
McPherson	11,111,669	1,284	11,112,953	O, G, SG
Marion	9,415,983	*	*	O, St, G
Marshall	....	720,076	720,076	Gp, SG, St
Meade	4,577,437	....	4,577,437	O, G
Miami	1,353,106	269,548	1,622,654	O, St, G
Mitchell	....	7,371	7,371	SG
Montgomery	1,507,265	5,649,708	7,156,973	C, O, St, G, Cl
Morris	1,135,745	86,931	1,222,676	O, St, G, SG
Morton	14,013,585	....	14,013,585	G, O
Nemaha	34,559	7,081	41,640	O, SG
Neosho	1,438,487	6,773,059	8,211,546	C, O, St, G
Ness	1,718,228	....	1,718,228	O
Norton	2,460,120	*	*	O, P, SG
Osage	29,475	114,400	143,875	St, Co
Osborne	216,947	16,800	233,747	O, SG
Ottawa	....	....	....	....
Pawnee	5,296,874	81,082	5,377,956	O, G, SG
Phillips	5,640,516	165,145	5,805,661	O, SG
Pottawatomie	....	93,838	93,838	St, SG
Pratt	7,248,693	13,520	7,262,213	O, G, SG
Rawlins	247,047	473	247,520	O, St
Reno	3,729,186	9,074,433	12,803,619	S, O, G, SG, NG, P, LP
Republic	....	*	*	SG
Rice	14,205,842	2,466,875	16,672,717	O, S, St, SG, G
Riley	165,455	104,636	270,091	O, SG, St
Rooks	17,289,128	....	17,289,128	O
Rush	1,804,778	....	1,804,778	O, H, G, NG, Bu
Russell	26,736,907	479,250	27,216,157	O, SG, G
Saline	1,769,047	*	*	O, SG
Scott	101,903	6,613	108,516	O, SG
Sedgwick	10,668,902	3,159,978	13,828,880	O, S, SG, NG, Bu, Pr, V
Seward	4,882,257	....	4,882,257	G, NG, Bu, Pr, O
Shawnee	....	930,957	930,957	St, SG
Sheridan	1,611,544	19,200	1,630,744	O, SG

246 *Geological Survey of Kansas—1960 Reports of Studies*TABLE 3.—*Value of mineral production in Kansas, by county, in 1959 (concluded)*

County	Value of mineral production			Commodities ^b in order of decreasing value
	Fuels ^a	Nonfuels	Total	
Sherman	381,748	93,904	475,652	O, SG
Smith	....	7,650	7,650	SG
Stafford	17,565,372	*	*	O, G, SG
Stanton	2,662,177	....	2,662,177	G, O
Stevens	11,382,711	....	11,382,711	G
Sumner	8,830,761	64,343	8,895,104	O, G, SG
Thomas	5,411	72,630	78,041	SG, O
Trego	5,325,512	*	*	O, SG
Wabaunsee	689,067	27,813	716,880	O, SG, St
Wallace	....	*	*	Dm, SG
Washington	....	138,965	138,965	SG
Wichita	644	....	644	O
Wilson	578,459	5,658,715	6,237,174	C, O, St, Cl, G
Woodson	2,227,371	66,500	2,293,871	O, St, G
Wyandotte	....	8,911,196	8,911,196	C, St, SG, Pe
Unassigned	48,310	11,820,476	11,868,786	Cl prod., St, SG
Undistributed	....	4,331,403	93,089,022	
Kansas total	\$442,788,460	\$ 81,846,159 ^c	\$524,634,619 ^c	

* Undistributed values may not be revealed.

^a The new minimum price of 11 cents per 1000 cubic feet of natural gas measured at 14.65 psia (pounds per square inch absolute) established by the Kansas Corporation Commission for the Hugoton Gas Area has been applied to all Kansas gas production, including minor amounts of unprorated production, much of which probably brought a higher price.

^b Commodities: B, brine; Bu, butane; C, cement; CB, carbon black; Cl, clay; Co, coal; Dm, diatomaceous marl; G, natural gas; Gp, gypsum; H, helium; LP, liquefied petroleum gases; NC, natural cement; NG, natural gasoline; O, oil; P, pumicite (volcanic ash); Pb, lead; Pe, perlite; Pr, propane; S, salt; SG, sand and gravel; St, stone; V, vermiculite; Zn, zinc.

^c Adjusted to eliminate duplication in value of clays and stone.

Sources of information.—Much of the information compiled in this report was obtained from the tabulation sheets provided by the United States Bureau of Mines, with which the State Geological Survey of Kansas has been cooperating for many years in collecting mineral statistics for the state. Coal statistics were derived from the reports of Mr. John Delplace, Chief Mine Inspector of the Mine Inspection Section and Mine Rescue Station of the Kansas Labor Department at Pittsburg, Kansas. Data pertaining to petroleum, natural gas, and related products were summarized from reports by Goebel and others on oil and gas developments in Kansas published as State Geological Survey Bulletins 138 and 147. Many of the data on oil and gas production in these bulletins were supplied by the Kansas Corporation Commission, Conservation Division. Other data (pertaining to expansion, modernization, and organization of new mineral producing companies) were obtained from *Midwest Industry Magazine* and *Kansas!*, the latter a publication of the Kansas Industrial Development Commission, Topeka.

MINERAL FUELS AND RELATED PRODUCTS

The mineral fuels—coal, oil, natural gas, the natural gas liquids, and related products (helium and carbon black)—contributed, as in former years, the greatest share to the mineral wealth produced in Kansas. In 1959 it amounted to 84.4 percent of the total value (\$442,788,460) as compared to 85.7 percent (\$440,976,227) in 1958 (Table 4, Fig. 3).

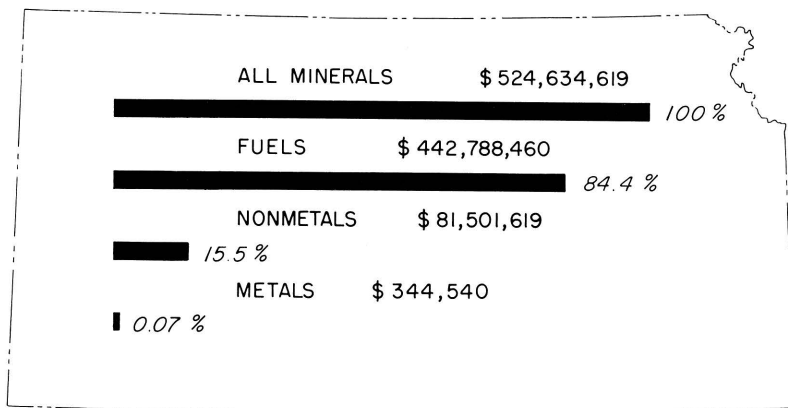


FIG. 3—Percent and value of mineral production in Kansas, 1959.

COAL

Coal production in Kansas in 1959 amounted to 774,360 tons, of which 768,632 tons or 99.2 percent was mined by stripping and 5,728 tons or 0.8 percent was deep or shaft mined. Although coal tonnage in 1959 was 7.4 percent less than the 1958 production of 830,009 tons, it was greater by 19,921 tons than in 1957, and 35,274 tons more than in 1955. Compared to the annual average of 1,312,229 tons of coal produced in the 1950-59 decade, however, coal production in 1959 was 537,869 tons or 40.9 percent less (Fig. 6). The coal mined in 1959 was worth \$3,491,700. In 1959 only 19 mines were in operation, 10 fewer than in the previous year. The 1950-59 decade saw a steady decline in the number of coal mines, both strip and shaft, in operation. In 1950, coal was mined in 52 strip mines and 32 shaft mines in Kansas, whereas at the end of the decade only 17 strip mines and 2 shaft mines were operating. Likewise the number of persons employed in the mines has decreased sharply from 1,261 at the beginning of the decade to 338 in 1959.

TABLE 4.—Value of minerals produced in Kansas in 1958 and 1959

Year	Mineral fuels and associated products	Percent of total	Nonmetals (excluding mineral fuels)	Percent of total	Metals	Percent of total	All minerals
1958	\$440,976,227	85.7	\$72,052,368	14.0	\$1,205,950	0.3	\$514,234,445
1959	442,788,460	84.39	81,501,619	15.54	344,540	0.07	524,634,619

TABLE 5.—Kansas coal production by type of mine and by county, value of coal, rank of counties, and number of mines, 1958 and 1959

County	1958			1959			Rank			Number of mines, 1959			
	Production, short tons			Production, short tons			1958			1959			
	Strip	Deep	Total	Strip	Deep	Total	Strip	Deep	Total	Strip	Deep	Strip	Deep
Bourbon	4,810	....	4,810	4,551	....	4,551	4	....	4,551	4	....	2	....
Cherokee	529,185	....	529,185	484,096	....	484,096	1	....	2,178,432	1	....	4	....
Coffey	2,138	....	2,138	2,230	....	2,230	5	....	11,150	5	....	1	....
Crawford	279,756	6,155	285,911	273,344	2,784	276,128	2	2,784	1,242,576	2	2,784	5	1
Franklin	195	....	195	157	....	157	7	....	785	7	....	1	....
Linn	1,157	....	1,157	1,303	....	1,303	6	....	6,515	6	....	2	....
Osage	3,088	3,525	6,613	2,951	2,944	5,895	3	2,944	29,475	3	2,944	2	1
All counties	820,329	9,680	830,009	768,632	5,728	774,360	....	768,632	\$3,491,688	....	768,632	17	2

In 1959, seven counties produced coal in Kansas. Of these, Cherokee County, which produced 484,096 tons valued at \$2,178,432, was foremost, as it has been since 1953. Next in importance was Crawford County, followed by Osage, Bourbon, Coffey, Linn, and Franklin Counties. Labette County ceased production in 1958. Production, value, and number of mines in 1959 are presented, by county, in Table 5.

The 1950-59 decade was a period of great variation in coal production in Kansas. Production in every one of the eight coal producing counties declined greatly. Cherokee County, which has held first place in production since 1953, had the least decline, 26.3 percent; Crawford County, which ranked second, had a decrease of 84.9 percent, but even this was not as great as the production decline in Linn County (99.7 percent) or in Labette County, which in 1958 ceased coal mining operations entirely.

As in former years the Pittsburg-Midway, Clemens, and Apex-Compton coal companies produced approximately 90 percent of the total coal output, 774,360 tons; Pittsburg-Midway Company produced more than half. The Blue Ribbon Coal Company of Crawford County and Bell mine in Osage County were the only shaft mines in operation in 1959.

Measured and indicated coal reserves in Kansas at the end of

TABLE 6.—Directory of Kansas coal mining companies on record as of December 31, 1959

County	Coal company	Office address
Bourbon	Garrett	Route 2, Garland
do	Pellett	Route 5, Fort Scott
Cherokee	Black Diamond	Weir
do	Pittsburg-Midway Coal Mining	P. O. Box 269, Pittsburg
do	S & M	Route 1, Scammon
do	Wilkinson	Weir
Coffey	S. L. Rogers	Lebo
Crawford	Apex-Compton	P. O. Box 211, Pittsburg
do	Blue Ribbon	Girard
do	Cliff Carr	Route 1, Mulberry
do	Clemens	P. O. Box 299, Pittsburg
do	Davis	Cherokee
do	Palmer & Son	Mulberry
do	Wisdom	Pittsburg
do	Wisdom Excavating Co.	805 N. Rouse St., Pittsburg
Franklin	McGrath-O'Dea	Homewood
Linn	Fyock	Prescott
do	Wood	Route 1, Pleasanton
Osage	Bell	Burlingame
do	Graham	Reading
do	Johnson	Scranton

1959 are estimated at 1,115,500,000 tons, of which approximately 836,500,000 tons is believed to be recoverable coal.

Coal companies operating in Kansas on record as of December 31, 1959, are listed in Table 6.

OIL

Crude oil production in Kansas in 1959 amounted to 119,473,875 bbl. or 468,219 bbl. less than in 1958, a decline of 0.4 percent. Of the total oil produced, approximately 15 percent or 17.9 million barrels was obtained by secondary recovery methods. The value was \$354,837,409 as compared to \$362,225,124 in 1958. The 2 percent change in value is attributed both to decreased production and to decrease in average price from \$3.02 a barrel to \$2.97 (Table 7). For the first time in many years Kansas ranked sixth instead of fifth among the oil producing states, although oil still ranked first among the mineral commodities produced in the state (Table 1).

TABLE 7.—*Crude oil production, value, and reserves, and number of oil fields named and revived in Kansas, 1958 and 1959*

	1958	1959	Percent change from 1958
Production, bbl.	119,942,094 ^a	119,473,875 ^a	—0.4
Value	\$362,225,124	\$354,837,409	—2.0
Price per bbl.	\$ 3.02	\$ 2.97	
Reserves, million bbl.	922.4	917.5	—0.5
Oil fields:			
Named	141 ^b	159 ^c	
Revived	8	8 ^c	

^a Figures supplied by State Corporation Commission, Conservation Division.

^b Five fields produced both oil and gas.

^c Two fields produced both oil and gas.

Since records of oil production in the state have been kept, Kansas has produced to the end of 1959 a recorded cumulative total of at least 3,130 million barrels of crude oil valued at \$6,350,000,000. Of this cumulative amount nearly 1,177,500,000 bbl. of oil or slightly more than 37 percent was produced in the 1950-59 decade. This oil was valued at approximately \$3,294,500,000 or slightly more than 51 percent of the total value of all oil produced in the state in the 70 years since 1889 (Table 35). Annual production of oil in Kansas since 1950 has exceeded 100,000,000 bbl. and the value has exceeded \$275,000,000.

The number of counties actually reporting production of oil was 80, four more than in 1958. Among the ten leading oil pro-

ducing counties, Barton, Ellis, Russell, Butler, and Graham Counties maintained the first five places respectively as in 1958. Greenwood County, which in 1958 ranked sixth, dropped to eighth place in 1959, and Rooks and Stafford Counties, which ranked seventh and eighth respectively in 1958, advanced to sixth and seventh places respectively in 1959 (Table 8).

TABLE 8.—Ten leading oil producing counties in Kansas, 1958 and 1959

County	Production, bbl.		Rank	
	1958	1959	1958	1959
Barton	11,546,500	11,404,683	1	1
Ellis	11,314,968	11,222,654	2	2
Russell	9,005,985	8,922,064	3	3
Butler	7,714,554	7,929,366	4	4
Graham	6,800,352	6,889,023	5	5
Rooks	6,389,441	6,066,361	7	6
Stafford	5,887,005	5,845,204	8	7
Greenwood	6,466,719	5,844,543	6	8
Rice	5,314,385	4,666,987	9	9
Cowley	4,171,897	3,858,450	10	10

Fifteen counties had a recorded and estimated cumulative production of 50 million barrels or more of oil at the end of 1959 (Table 9). Of these, Butler County, in eastern Kansas, ranked first, having produced 437,516,367 bbl. of oil or 105,326,169 bbl. more than second-place Barton County and 131,062,212 bbl. more than Russell County, third in rank.

TABLE 9.—Leading oil producing counties in Kansas based upon reported, estimated, and recorded cumulative production to end of 1959

County	Cumulative production, bbl.		Rank	
	1958	1959	1958	1959
Butler	429,587,001	437,516,367	1	1
Barton	320,785,515*	332,190,198	2	2
Russell	297,532,091	306,454,155	3	3
Greenwood	223,042,369	228,886,912	4	4
Ellis	215,675,431	226,888,085*	6	5
Rice	221,189,082	225,856,069*	5	6
McPherson	144,568,785*	148,269,306*	7	7
Stafford	132,617,382*	138,426,185*	8	8
Cowley	96,488,132	100,346,582	9	9
Ellsworth	91,774,706	93,924,791	10	10
Rooks	80,471,282*	86,537,643	11	11
Sumner	70,001,482*	72,893,539	12	12
Sedgwick	67,726,683	70,479,157	13	13
Reno	62,893,875	63,896,384	14	14
Graham	50,555,688	57,444,711	15	15

* Corrected cumulative.

TABLE 10.—*Leading oil fields in Kansas, 1958 and 1959*

Field	Rank		County	Annual production, bbl.	
	1958	1959		1958	1959
Bemis-Shutts	1	1	Ellis-Rooks	5,062,516	4,867,675
El Dorado	2	2	Butler	4,370,959	4,443,182
Chase-Silica	5	3	Rice-Barton-Stafford	3,259,898	3,689,358
Hall-Gurney	4	4	Russell-Barton	3,295,576	3,253,461
Trapp	3	5	Russell-Barton	3,365,752	3,120,143
Kraft-Prusa	6	6	Barton-Ellsworth	3,092,206	2,889,685

Most of the larger oil fields are in western Kansas (Table 10). Of the six major oil fields, only the El Dorado field in Butler County lies east of the Sixth Principal Meridian, which is the division line between eastern and western Kansas insofar as oil and gas are concerned. Of the six leading oil fields, the El Dorado and Chase-Silica fields had increases in annual production in 1959; the Chase-Silica field advanced from fifth rank to third, exchanging positions with the Trapp field.

In keeping with the trend of recent years, Kansas in 1959 continued to consume a greater percentage of its annual oil production. In 1954 Kansas consumed 74.6 percent of its annual oil production whereas in 1959 it consumed 92.1 percent, 4.6 percent more than in 1958 (Table 11). Imports of oil in 1959 were 41,884,138 bbl. as compared to 37,895,812 bbl. in 1958, an increase of 10.5 percent. Exports were less, however, in 1959 than in 1958 by 1,472,113 bbl. or 2.8 percent. Total quantity of oil accounted for in 1959 was 161,358,014 bbl. compared to 157,837,906 bbl. in 1958. Data on production, consumption, imports, exports, and total quantity of oil accounted for in 1958 and 1959 are listed in Table 11. During the 1950-59 decade consumption and imports steadily increased. Production increased to a maximum of nearly 124,500,000 bbl. in 1956 and has since declined; exports have fluctuated between about 49,700,000 and 58,700,000 bbl. Figure 6 shows the trends of oil production and value over the decade.

TABLE 11.—*Production, consumption, imports, and exports of crude oil in Kansas, 1958 and 1959,* in bbl.*

Year	Production	Consumption		Imports	Exports	Total quantity, production plus imports
		Quantity	Percent of production			
1958	119,942,094	105,107,743	87.6	37,895,812	52,730,163	157,837,906
1959	119,473,875	110,099,964	92.2	41,884,139	51,258,050	161,358,014

* From Conservation Division, State Corporation Commission.

TABLE 12.—Number of oil and gas fields named and revived, by county, in 1959

County	New				Revived				Total
	Oil	Gas	Oil and gas	Dry and abandoned	Oil	Gas	Oil and gas	Dry and abandoned	
Barber	2	2	...	...	...	...	1	...	5
Barton	18	...	...	...	...	...	1	...	19
Butler	6	...	...	...	1	...	...	...	7
Chase	1	...	...	...	...	...	...	...	1
Chautauqua ..	1	...	...	...	...	...	...	...	1
Cheyenne	3	...	...	...	...	...	...	...	3
Clark .....	...	4	...	...	...	...	...	...	4
Cowley	7	1	...	...	...	...	...	...	8
Decatur	2	...	...	...	...	...	...	...	2
Edwards	2	1	...	...	...	...	1	...	4
Ellis	16	...	...	1	...	...	...	...	17
Finney	3	...	...	...	...	...	...	...	3
Geary	1	...	...	1	...	...	...	...	2
Gove	1	...	...	...	...	...	...	...	1
Graham	9	...	...	...	...	...	...	...	9
Grant	2	3	...	...	...	...	...	...	5
Greenwood	1	...	...	...	...	...	...	...	1
Hamilton	1	1	...	...	...	...	...	...	2
Harper	1	1	...	...	...	...	...	...	2
Harvey	1	...	...	...	...	...	...	...	1
Haskell	3	...	...	...	...	...	...	...	3
Hodgeman	4	...	...	...	...	...	...	...	4
Kearny .....	...	1	...	...	...	...	...	...	1
Kingman	2	1	...	...	...	...	...	...	3
Kiowa .....	...	1	...	...	...	...	...	...	1
Logan	1	...	...	...	...	...	...	...	1
McPherson	3	...	...	...	...	...	...	...	3
Marion	4	1	...	...	...	...	...	...	5
Meade .....	...	8	...	...	...	...	...	...	8
Morris	1	...	...	...	...	...	...	...	1
Morton .....	...	4	...	...	...	...	...	...	4
Ness	2	...	...	...	...	...	...	...	2
Norton .....	...	...	...	1	...	...	...	...	1
Pawnee	1	1	...	...	...	...	...	...	2
Phillips	2	...	...	...	...	...	...	...	2
Pratt	2	1	...	...	...	...	...	...	3
Rawlins	4	...	...	...	...	...	...	...	4
Reno	2	1	...	...	...	...	...	...	3
Rice	2	...	...	...	...	...	...	...	2
Riley	1	...	...	...	...	...	...	...	1
Rooks	6	...	...	...	1	...	...	...	7
Rush	1	...	...	...	...	...	...	...	1
Russell	3	...	...	...	...	...	...	...	3
Saline	2	...	...	...	...	...	...	...	2
Scott	1	...	...	...	...	...	...	...	1
Sedgwick	1	...	...	2	1	...	...	...	4
Sheridan	3	...	...	...	...	...	...	...	3
Stafford	10	2	1	...	2	...	...	...	15
Stanton	2	1	...	...	...	...	...	...	3
Stevens .....	...	4	...	...	...	...	...	...	4
Sumner	9	...	...	...	...	...	...	...	9
Thomas	1	...	...	...	...	...	...	...	1
Trego	1	...	...	...	...	...	...	...	1
Wabaunsee ..	1	...	...	...	...	...	...	...	1
Total	153	39	1	5	5	0	2	1	206

Crude oil reserves in 1959 are estimated at 917,500,000 bbl. or 0.5 percent less than in 1958 (Table 7). Crude oil reserves have gradually declined since 1955 although the total number of new oil fields has in general increased. In 1959, 198 new oil and gas fields excluding 8 revived fields were named; 153 were oil fields, 39 gas fields, 1 an oil and gas field, and 5 fields later abandoned. Counties in which new oil fields were named in 1959 are listed in Table 12.

During 1959, 30 miles of 8-inch oil pipeline, 45 miles of 6- and 8-inch trunk line, and 15 miles of gathering lines were connected to the Jayhawk pipeline at Harper Ranch station in Clark County, Kansas, from Oklahoma. In addition the capacity of the Jayhawk Pipeline Corp. crude line was increased by two new booster stations, one at Harper Ranch and one at Haviland in Kiowa County. The Eubank and Taloga oil fields of southwestern Kansas were connected to the Jayhawk pipeline during the year. Also a gathering line, consisting of 44 miles of 6-inch and 12 miles of 3- and 4-inch pipe, serving the Pleasant Prairie pool in Kearny County, was completed and connected to the Jayhawk Pipeline Corp. system. At Stockton, Rooks County, the Cooperative Refinery Association added 6 miles of 6-inch line to their pipeline system.

A new HF alkylation unit was put in operation at the Skelly Oil Company's refinery at El Dorado, Butler County, in 1959.

TABLE 13.—*Directory of petroleum refineries in Kansas as of December 31, 1959*

Refinery	Office address	County
American Petrofina Co. of Texas	El Dorado	Butler
Anderson-Prichard Oil Corp.	Arkansas City	Cowley
Century Refining Co., Inc. ^a	114 W. Pine, Garden City	Finney
Cooperative Refinery Assn.	Coffeyville	Montgomery
Cooperative Refinery Assn.	P.O. Box 570, Phillipsburg	Phillips
Derby Refining Co.	420 W. Douglas, Wichita	Sedgwick
Mid-America Refining Co., Inc.	Chanute	Neosho
Mobil Oil Co.	Augusta	Butler
National Cooperative Refinery Assn.	P.O. Box 770, McPherson	McPherson
Phillips Petroleum Co.	2029 Fairfax Trafficway, Kansas City	Wyandotte
Skelly Oil Co.	1401 S. Douglas Road, El Dorado	Butler
Standard Oil Co. (Indiana)	1101 Illinois, Neodesha	Wilson
Vickers Petroleum Co., Inc.	Wichita ^b	Sedgwick

^a Successor to Shallow Water Refining Company, refinery at Shallow Water, Scott County.

^b Refinery at Potwin, Butler County.

At Kansas City, Wyandotte County, the Phillips Petroleum Company was constructing a 6,600-bbl. HF alkylation unit. During the year the Derby Refining Company changed its name to Derby Refining Company Division, Colorado Oil and Gas Corporation.

The Iowa Farm and Supply Company of Des Moines, Iowa, acquired the Midland Cooperative, Inc., interest in the National Cooperative Refinery Association, which operates a 30,000-bbl. refinery at McPherson, McPherson County. A directory of refineries is given in Table 13.*

NATURAL GAS

In 1959 Kansas dropped from fifth to sixth rank among the states producing natural gas, but natural gas retained second place among the mineral commodities produced in the state. In 1959, gas production in Kansas amounted to 595,244,836 M cu. ft. (calculated at the base of 14.65 pounds per square inch absolute) or 11.1 percent more than in 1958, when production was 535,937,434 M cu. ft. Value of 1959 gas production, based on a fixed minimum price of 11 cents per thousand cu. ft., was \$65,476,932 as compared to \$58,953,118 in 1958, also an 11.1 percent increase (Table 14). Cumulative natural gas production in Kansas from the first recorded production to the end of 1959 is estimated at 8 trillion cubic feet, of which quantity more than 4.7 trillion cubic feet of gas or approximately 59 percent was produced in the ten-year period 1950-59. Of the total cumulative production about 61 percent has been obtained from the Hugoton Gas Area. In the 1950-59 decade this area produced about 3,728 billion cubic feet

TABLE 14.—*Natural gas production, value, and reserves, and gas fields named and revived in Kansas, 1958 and 1959*

	1958	1959	Percent change from 1958
Production, M cu. ft. (14.65 psia)	535,937,434	595,244,836	+11.1
Value	\$58,953,118	\$65,476,932	+11.1
Reserves, million cu. ft.	20,230,000	19,980,000	— 1.2
Gas fields:			
Named	21 ^a	41 ^b	
Revived	2	2 ^b	

^a Five fields produced both oil and gas.

^b Two fields produced both oil and gas.

* For names of oil companies, independent operators, and consulting geologists, see Kansas Geological Society Directory published by the Society at 508 East Murdock Street, Wichita 5, and Morrison Petroleum Directory of Kansas, published annually by John H. Morrison, Box 191, Wichita.

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TABLE 15.—*Production and value of natural gas in Hugoton Gas Area, Kansas, 1958 and 1959*

Year	Production, M cu. ft. (14.65 psia)	Value	Percent of state total production	Cumulative production, M cu. ft.
1958	349,263,723	\$38,419,009	65.0	
1959	404,764,021	\$44,524,042	68.0	5,014,481,442
Percent change from 1958	+15.9	+15.9		

of gas, 74.3 percent of its cumulative production (Table 15) and 79.2 percent of the state's production during the decade.

Natural gas was produced in 1959 in 50 counties, one more than in the previous year. Each of 18 counties, one fewer than in 1958, (Table 16), produced 2 billion cubic feet or more of gas. All except Edwards and Rush Counties produced more gas in 1959 than in 1958, although counties below 9th place in 1959 ranked somewhat differently than in 1958. Although Edwards County had produced 2,038,145 M cu. ft. of gas in 1958, it ranked 19th in 1959, producing only 1,681,798 M cu. ft. Annual gas production has exceeded 500,000,000 M cu. ft. since 1956 and 100,000,000 M cu. ft. since 1943 (Fig. 6).

Three more counties, Harper, Reno, and Kiowa, were added

TABLE 16.—*Production of natural gas in Kansas counties producing 2 billion cubic feet or more annually, 1958 and 1959*

County	Production, M cu. ft. (14.65 psia)		Rank	
	1958	1959	1958	1959
Stevens ^a	90,231,496	103,479,190	1	1
Grant ^a	76,951,008	90,869,682	3	2
Morton ^{a, b}	84,762,672	85,803,592	2	3
Kearny ^a	62,477,345	69,576,597	4	4
Barber	51,428,484	55,081,079	5	5
Finney ^a	36,885,767	44,291,434	6	6
Haskell ^a	23,456,900	28,702,647	8	7
Seward ^{a, b}	24,421,166	26,228,374	7	8
Stanton ^a	19,944,619	23,846,214	9	9
Kingman	11,686,453	15,351,781	10	10
Meade	10,295,596	12,738,162	11	11
Clark	6,536,692	6,897,840	12	12
Harper	2,977,950	4,839,145	15	13
Reno	3,578,905	4,653,637	14	14
Hamilton ^a	4,228,915	4,254,341	13	15
Pawnee	2,607,146	2,744,249	17	16
Kiowa	2,090,043	2,617,650	18	17
Rush	2,632,657	2,401,929	16	18
Edwards	2,038,145	....	19	....

^a Hugoton Gas Area counties.

^b Not all gas produced in Morton and Seward Counties is from the Hugoton Gas Area.

to the list of counties that had a cumulative production of natural gas of 10 billion cubic feet or more to the end of 1959 (Table 17). Changed in rank from 1958 are Kingman County, 11th in 1959 as compared to 12th in 1958, Pawnee County, 12th instead of 11th, Edwards County, 18th instead of 19th, and Stafford County, 20th instead of 18th. Although complete production records are not available, it is certain that four eastern counties, Allen, Cowley, Montgomery, and Wilson, have each produced 10 billion cubic feet or more of gas since production started. Table 17 shows the cumulative gas production and rank of the leading Kansas counties.

Reserves of natural gas in 1959 were estimated at 19,980,000 million cubic feet, 1.2 percent less than in 1958 (Table 14), although reserves have generally increased during the last decade. Forty-one new gas fields (39 gas and 2 gas and oil fields) were discovered in 1959, 20 more than in the previous year. Also two gas fields producing oil were revived (Table 14).

TABLE 17.—Leading gas producing counties in Kansas based on estimated and recorded cumulative production to end of 1959*

County	Cumulative production, M cu. ft. (14.65 psia)	Rank	
		1958	1959
Stevens ^a	1,778,350,978	1	1
Grant ^a	1,020,941,851	2	2
Kearny ^a	726,059,436	3	3
Morton ^{a, b}	609,800,873	4	4
Barber	451,985,074	5	5
Finney ^a	377,080,328	7	6
Haskell ^a	367,001,271	6	7
Seward ^{a, b}	293,666,784	8	8
Stanton ^a	171,159,802	9	9
Meade	51,544,220	10	10
Kingman	50,775,962	12	11
Pawnee	40,546,071	11	12
Rice	35,553,190	13	13
Hamilton ^a	34,785,760	14	14
Barton	24,318,652	15	15
Pratt	21,777,560	16	16
Clark	19,773,690	17	17
Edwards	14,065,788	19	18
Harper	13,987,087	....	19
Stafford	13,590,727	18	20
Reno	11,960,480	....	21
Kiowa	10,441,040	....	22

^a Hugoton Gas Area counties.

^b Not all gas produced in Morton and Seward Counties is from the Hugoton Gas Area.

* Several eastern Kansas counties, although no longer important gas producers, formerly yielded great quantities of gas. Published cumulative production data on gas production for eastern counties are not available. It is reasonably certain, however, from data that are extant, that Allen, Cowley, Montgomery, and Wilson Counties have each produced 10 billion cubic feet of gas or more.

Cities Service Gas Company added 21.5 miles of 30-inch pipe to its system from Welda, Anderson County, to Princeton, Franklin County; 10 miles of 16-inch pipe in the Ottawa area, Franklin County; 7.2 miles of 16-inch pipe in the Fort Scott area, Bourbon County; 25 miles of 12-inch pipe between Hutchinson, Reno County, and Ellsworth, Ellsworth County; and completed 4.4 miles of 16-inch replacement pipe west of Lawrence, Douglas County.

The Michigan Wisconsin Pipe Line Company constructed four 24-inch loops and part of a fifth for a total of 137 miles of line on its main line that extends from the Hugoton Gas Area diagonally eastward across the state. The Wheatland Natural Gas Company installed 125 miles of 1- to 4-inch pipeline in Scott, Wichita, and Wallace Counties for supplying fuel to irrigation systems. A second similar gas-distributing system of the same company was completed in Finney, Gray, and Haskell Counties, totaling 65 miles of 1- and 2-inch pipeline. The Northern Natural Gas Company constructed 11 miles of 30-inch pipe on its line between Clifton, Washington County, and Trescott, Ottawa County; 8 miles of 30-inch pipe between Trescott and Bushton, Barton County; and 8 miles of 30-inch pipe along a line from Beaver, Oklahoma, to Mullinville, Kiowa County, Kansas. In the Hugoton Gas Area, Panhandle Eastern Pipeline Company completed 16 miles of 10-inch, 13 miles of 6-inch, 40 miles of 4-inch, and 1 mile of 2-inch gathering lines. In the northwestern part of the state the Kansas-Nebraska Natural Gas Company completed 15.5 miles of 12-inch loop.

Cities Service Gas Company built its first satellite compressor station near Sublette, Haskell County, in 1959, and the Kansas-Nebraska Natural Gas Company installed a 1,800-horsepower compressor station at Quinter, Gove County, a 950-horsepower station at Holcomb, Finney County, and a similar compressor station at Palco, Rooks County. The Northern Natural Gas Company added 2000 horsepower to its compressor stations at Clifton, Washington County; Mullinville, Kiowa County; and Bushton, Barton County.

NATURAL GAS LIQUIDS

In 1959 Kansas produced 5,543,983 bbl. of natural gas liquids—natural gasoline, propane, butane, and other miscellaneous

TABLE 18.—Production and value of natural gas liquids in Kansas, 1958 and 1959

	1958		1959	
	Quantity, bbl.	Value ^a	Quantity, bbl.	Value
Natural gasoline	2,600,607	\$ 6,007,402	2,554,365	\$ 5,900,583
Propane	1,363,436	2,113,326	1,426,595	3,152,775
Butane	993,269	1,539,567	1,507,175	3,112,280
Other LPG	404,027	626,242	55,848	86,564
Total	5,361,339	\$10,286,537	5,543,983	\$12,252,202
Percent change from 1958			+3.4	+19.1

^a Estimated average price \$2.31 per barrel for natural gasoline, all others \$1.55.

liquefied gases, valued at \$12,252,202. Production in 1959 was 3.4 percent greater than in 1958, and value was 19.1 percent greater (Table 18). The price per barrel of natural gasoline in 1959 was \$2.31, the same as in the previous year. The estimated price per barrel of all other natural gas liquids in 1958 was \$1.55 whereas in 1959 propane was priced at \$2.21 per barrel, butane at \$2.06 per barrel, and all other LPG at \$1.55 per barrel. Although the total quantity of natural gas liquids in 1959 was greater by 3.4 percent than in 1958, Kansas produced less natural gasoline and miscellaneous LPG in 1959 than in 1958. Production of propane and butane, on the other hand, showed increases (Table 18).

During the 1950-59 period Kansas produced 48 million barrels of natural gas liquids valued at \$117,000,000 (Fig. 6). The 1950-59 production and value of natural gas liquids approximated 58 and 63 percent respectively of the estimated cumulative production

TABLE 19.—Directory of Kansas plants producing natural gasoline and liquefied petroleum gas on record as of December 31, 1959

Plant location		
County	Town	Company
Barber	Medicine Lodge	Skelly Oil Company
Finney	Holcomb	Northern Natural Gas Company
Grant	Ulysses	Hugoton Production Company
do	do	Pan American Petroleum Corporation
do	do	Socony Mobil Oil Company, Inc.
Haskell	Sublette	Northern Natural Gas Company
Kearny	Lakin	Colorado Interstate Gas Company
do	Deerfield	Kansas-Nebraska Natural Gas Company
Kingman	Spivey	Socony Mobil Oil Company, Inc.
Reno	Burrton	Cities Service Oil Company
Rush	Otis	Dunn-Mar Oil & Gas Company
Sedgwick	Wichita	Cities Service Oil Company
do	Cheney	Plateau Natural Gas Company
Seward	Liberal	Panhandle Eastern Pipeline Company

(recorded since 1916 for natural gasoline, since 1941 for LPG) of 82,000,000 bbl. valued at \$187,000,000.

Proved reserves of natural gas liquids, 196,912,000 bbl., were 1.3 percent less than in 1958, when reserves were estimated to be 199,552,000 bbl. The estimated 1959 reserves of natural gas liquids were exceeded but once during the 1950-59 decade.

Okan Pipeline Company built 28 miles of 4-inch pipeline for LPG and natural gasoline between their Mocane plant in Beaver County, Oklahoma, and their station at Liberal, Seward County, Kansas.

In 1959 natural gasoline and liquefied petroleum gas were produced by 14 companies in 14 plants in 10 counties (Table 19).

HELIUM

Both production and shipments of helium in Kansas were less in 1959 than in 1958. Production in 1959 amounted to 24,004,300 cu. ft. and shipments were 21,642,500 cu. ft. whereas in 1958 production was 25,858,000 cu. ft. and shipments were 27,888,000 cu. ft. Shipments in 1959 were 22.4 percent less than in 1958. The 1959 shipments were worth \$342,619 or 20.7 percent less than in 1958, when helium shipments were valued at \$432,264. Production and price are controlled by the Federal Government. Federal agencies pay \$15.50 per 1000 cu. ft. at the production plants plus 45c per cylinder filling charge for shipment in cylinders. Other users pay \$19.00 at the plant and an additional \$2.00 per 1000 cu. ft. for helium supplied in standard cylinders. Annual production and shipments of helium during the 1950-59 decade rose to 45,000,000 cu. ft. in 1956 and have since declined (Fig. 6). Total value of helium shipments during the decade approximates \$4,700,000.

Helium was produced at the United States Bureau of Mines plant at Otis, Rush County. The gas is extracted from helium-bearing natural gas from about 80 wells distributed in Barton, Pawnee, and Rush Counties. Helium-contributing gas fields include the Otis-Albert field in Rush and Barton Counties, the Ryan field in Rush and Pawnee Counties, the Pawnee Rock field in Pawnee County, the Reichel field in Rush County, and the Behrens and Unruh fields in Barton County. The Ash Creek field, Pawnee County, and the Dundee and Bergtal fields, Barton County, which formerly supplied helium, have been abandoned.

CARBON BLACK

In 1959 Kansas produced 91,644,160 lbs. of carbon black, 16,200,410 lbs. (21.4 percent) more than in 1958. The 1959 product was valued at \$6,387,598 or 21.4 percent more than in 1958, when the value was \$5,261,142. An estimated 4.62 billion cubic feet of gas and 0.39 million barrels of natural gas liquids were consumed in the manufacture of carbon black in 1959. Carbon black ranked eighth in value among the mineral commodities produced in the state. Production of carbon black exceeded 857,000,000 lbs., worth \$48,000,000, during the 1950-59 decade. In 1959 carbon black was produced by the Columbian Carbon Company at Hickok and by the United Carbon Company at Ryus, both in Grant County.

NONMETALLIC MINERALS

The value of the 1959 production of nonmetallic minerals, exclusive of mineral fuels, and associated products (cement, clay, diatomaceous marl, gypsum, pumicite or volcanic ash, salt, sand and gravel, stone, and perlite and vermiculite products) was \$81,501,619 or 15.54 percent of the total value of all minerals produced in the state (Table 4, Fig. 3).

CEMENT (PORTLAND AND MASONRY)

Cement production, shipments, and value in 1959 exceeded those of 1958. Total production and total shipments of cement, excluding natural cement, in Kansas in 1959 were 10,525,163 bbl. and 10,405,209 bbl. respectively, whereas in 1958 total cement production amounted to 9,537,119 bbl. and total shipments to 9,600,697 bbl. The increases in total production and shipments were smaller in 1959 (10.4 and 8.4 percent respectively) than in 1958 (13.2 and 17.4 percent). The value of shipments in 1959 was \$32,282,687 or \$2,234,954 (7.4 percent) more than in the previous year, when it amounted to \$30,047,733. Of the total quantity of cement produced, 10,177,183 bbl. or 96.7 percent was portland cement and only 347,880 bbl. or 3.3 percent was masonry cement. Portland cement production in 1959 was greater by 932,999 bbl. (10 percent) than it was in 1958. Shipments of portland cement in 1959 exceeded 1958 shipments by 8.1 percent in quantity and 7.1 percent in value. Quantity and value of portland cement

shipped in 1959 were respectively 10,055,944 bbl. and \$30,889,337, whereas in 1958 the amount shipped was 9,298,427 bbl. worth \$28,843,139. The average price of portland cement in 1959 was \$3.07 per barrel, 3¢ less than in the previous year. Kansas produced 347,880 bbl. of masonry cement in 1959 or 18.8 percent more than in 1958. Shipments and value of masonry cement exceeded by 15.5 and 15.7 percent respectively those of 1958. Shipments in 1959 amounted to 349,265 bbl. valued at \$1,393,350. The average price of masonry cement in 1959 was \$3.99 per barrel, the same as in 1958. Data on production, shipments, and value of portland, masonry, and total cement are presented in Table 20.

As in previous years Allen County, which includes two of the seven cement plants in the state, led in production and shipments in 1959. Neosho County was second, followed by Montgomery County. Although Wilson County led Wyandotte in shipments, Wyandotte County produced slightly more than Wilson County. Bourbon County, represented by the only natural cement producing company in the state, the Fort Scott Hydraulic Cement Company, Fort Scott, produced some masonry cement. Stocks on hand at year's end were 1,001,142 bbl. as compared to 923,218 bbl. on December 31, 1958, an increase of 8.4 percent.

Value of natural cement production is included under "Undistributed" minerals in Table 1 and is discussed on page 278.

Kansas cement is exported to Arkansas, Illinois, Iowa, Minnesota, Missouri, Nebraska, Oklahoma, South Dakota, Texas, Wyoming, and several foreign countries. Cement is third in importance among the minerals produced in the state.

The seven cement producers on record as of December 31, 1959, are listed in Table 21.

CLAY AND SHALE

Clay and shale production in Kansas in 1959 amounted to 1,020,560 tons valued at \$1,270,341, an increase of 16.6 percent in tonnage and 10.9 percent in value. Production and value in 1959 are the highest in the 1950-59 decade. Kansas clay and shale produced consisted of fire clay and miscellaneous clay (including shale used for cement), the former being produced in Barton, Cloud, Crawford, and Ellsworth Counties and the latter in Allen, Cherokee, Crawford, Franklin, Montgomery, and Wilson Counties. Fire clay production in 1959 increased 45.6

TABLE 20.—Production, shipments, and value of portland and masonry cement in Kansas, 1958 and 1959, 376-lb. bbl.

Commodity	Shipments					
	Production, bbl.		1958		1959	
	1958	1959	Bbl.	Value	Bbl.	Value
Portland	9,244,184	10,177,183	9,298,427	\$28,843,139	10,055,944	\$30,889,337
Average price/bbl.		+10.1		3.10	+8.1	3.07
Percent change from 1958		347,880	302,270	1,204,594	349,265	1,393,350
Masonry	292,935			3.99		3.99
Average price/bbl.		+18.8			+15.5	+15.7
Percent change from 1958	9,537,119	10,525,063	9,600,697	\$30,047,733	10,405,209	\$32,282,687
Total		+10.4			+8.4	+7.4
Percent change from 1958						

TABLE 21.—Directory of cement producers in Kansas, 1959

County	Company	Office address	Quarry	Type
Allen	Lehigh Portland Cement Co.	Young Bldg., 718 Hamilton St., Allentown, Pennsylvania	Iola	Portland and masonry
Allen	Monarch Cement Co.	Humboldt	Humboldt	do
Bourbon	Fort Scott Hydraulic Cement Co.	P.O. Box 267, Fort Scott	Fort Scott	Natural and masonry
Montgomery	Universal Atlas Cement Co.	100 Park Ave., New York 17, New York	Independence	Portland and masonry
Neosho	Ash Grove Lime & Portland Cement Co.	101 W. 11th, Kansas City 6, Missouri	Chanute	do
Wilson	Consolidated Cement Corp.	Fredonia	Fredonia	do
Wyandotte	Lone Star Cement Corp.	1006 Grand Ave., Kansas City 6, Missouri	Bonner Springs	do

percent in quantity and 17.5 percent in value from 1958, whereas production of miscellaneous clay exceeded the 1958 production by 8.8 percent and value exceeded 1958 value by 6.8 percent.

Clay used for cement in 1959 amounted to 411,865 tons or 13 percent more than in 1958 when 364,588 tons was used. In 1959, eight companies operating in nine counties produced clay or shale. Disregarding clay used for cement, Cloud, Crawford, Franklin, and Barton Counties led in 1959. Kansas clay and shale is used primarily for the manufacture of brick (136,757,000 were produced in 1959 or 25,847,000 more than in 1958), tile, cement, and lightweight aggregate. Raw clay and shale ranked 16th among mineral commodities produced in 1959 and 6th if clay products are included. Table 22 presents data on clay and shale sold or used by producers in Kansas in 1958 and 1959.

The Cloud Ceramics Company of Concordia, Cloud County, reopened 10 periodic kilns during 1959, increasing output to 3.5 million bricks per month. The Consolidated Cement Corp., located at Fredonia, Wilson County, is now the General Portland Cement Company of 111 West Monroe Street, Chicago, Illinois. Kansas Industries, Inc., formerly at 4001 Kaw Drive, Kansas City, has moved.

Reserves of clay and shale are almost without limit. In central and north-central Kansas, where the most valuable clays in the state are found, reserves of strippable high grade clays are estimated to be at least 125 billion tons.

A directory of clay and shale producers in Kansas in 1959 is given in Table 23.

SALT

For the third time in the 1950-59 decade, salt production in Kansas has shown an increase. In 1959 Kansas produced a total of 899,252 tons of salt of which 510,292 tons or 56.7 percent was rock salt and 388,960 tons or 43.3 percent was evaporated salt. Production of salt in 1959 exceeded production in 1958 by 5 percent. Value of salt produced in 1959 amounted to \$11,687,446 or 10.9 percent more than in 1958. Value of salt produced has increased each year in the decade by amounts ranging from 3.1 percent in 1951 to 12.2 percent in 1950. Although Kansas produces more rock salt than evaporated salt each year, the value of the evaporated salt greatly exceeds that of rock salt. In 1959

TABLE 22.—Clay and shale sold or used by producers in Kansas, 1958 and 1959

Year	Brick tile		Cement		Total		Clay and clay products
	lightweight aggregate	aggregate	Tons	Value	Tons	Value	
1958	510,853	\$780,395	364,588	\$364,588	875,441	\$1,144,983	\$10,500,000
1959	608,695	858,476	411,865	411,865	1,020,560	1,270,341	\$11,500,000
Percent change from 1958	+19.2	+10.0	+13.0	+13.0	+16.6	+10.9	

TABLE 23.—Directory of clay and shale producers in Kansas in 1959

County	Company	Office address	Pit location	Type plant*
Allen	Humboldt Shale Mining Co.	P.O. Drawer 97, Humboldt	Humboldt	B
Allen	Lehigh Portland Cement Co.	Young Bldg., 718 Hamilton St., Allentown, Pa.	Iola	C
Allen	Monarch Cement Co.	Humboldt	Humboldt	C
Allen	United Brick & Tile Co.	207 Pickwick Bldg., Kansas City 42, Mo.	Iola	B
Barton	Acme Brick Co.	P.O. Box 425, Fort Worth, Texas	Great Bend	B
Barton	Kansas Brick & Tile Co.	Hoisington	Hoisington	B
Cherokee	United Brick & Tile Co.	207 Pickwick Bldg., Kansas City 42, Mo.	Weir	B
Cloud	Cloud Ceramics	Concordia	Concordia	B
Crawford	W. S. Dickey Clay Mfg. Co.	607-617 Commerce Trust Bldg., Kansas City 6, Mo.	Pittsburg	B
Ellsworth	Acme Brick Co.	P.O. Box 425, Fort Worth, Texas	Kanopolis	B
Franklin	Buidlex, Inc.	P.O. Box 299, Pittsburg	Ottawa	A
Jewell	Ideal Cement Co.	507 Denver National Bank Bldg., Denver, Colo.	Coffeyville	C
Montgomery	United Brick & Tile Co.	207 Pickwick Bldg., Kansas City 42, Mo.	Independence	B
Montgomery	Universal Atlas Cement Co.	100 Park Ave., New York 17, N.Y.	Independence	C
Neosho	Ash Grove Lime & Portland Cement Co.	101 W. 11th St., Kansas City 6, Mo.	Chanute	C
Wilson	Acme Brick Co.	P.O. Box 425, Fort Worth, Texas	Buffalo	B
Wilson	General Portland Cement Co.	111-West Monroe St., Chicago, Ill.	Fredonia	C
Wilson	Excelsior Brick Co.	P.O. Box 32, Fredonia	Fredonia	B

* A, aggregate; B, brick; C, cement.

the value of evaporated salt was \$9,034,759 whereas the value of rock salt was only \$2,652,687. Tonnage of rock and evaporated salt in 1959 exceeded tonnage of the previous year by 5.5 and 4.2 percent respectively (Table 24).

TABLE 24.—*Salt sold or used by producers in Kansas, 1958 and 1959, short tons*

Year	Evaporated salt		Rock salt		Total	
	Tons	Value	Tons	Value	Tons	Value
1958	373,263	\$7,962,669	483,562	\$2,575,700	856,825	\$10,538,369
1959	388,960	9,034,759	510,292	2,652,687	899,252	11,687,446
Percent change from 1958 ..	+4.2	+13.5	+5.5	+3.0	+5.0	+10.9

Commercial salt was produced by five companies operating in three counties, Ellsworth, Reno, and Rice; the Reno County production was more than half of the total. A new company, the Pawnee Salt Corp. of Pawnee Rock in Barton County, organized in 1958 to produce salt by the evaporating process, had not completed their plant and did not report any salt production in 1959. In addition to the ordinary commercial salt producing companies, the Frontier Chemical Company of Kansas, Inc., Wichita, a division of Vulcan Materials Company of Birmingham, Alabama, produces its own salt from wells in Sedgwick County for use in the manufacture of industrial inorganic chemicals.

Salt ranked fifth in value among minerals produced in the state in 1959. Kansas salt in 1959 was shipped to 33 states, the District of Columbia, Canada, Guatemala, and Puerto Rico. Since salt production first started, Kansas has produced approximately

TABLE 25.—*Directory of salt companies in Kansas in 1959*

County	Company	Office address	Location of mine or well	Type of plant
Barton	Pawnee Salt Corp.	Pawnee Rock	Pawnee Rock	Evaporated Rock
Ellsworth	Independent Salt Co.	4115 Parkers Ave., Chicago 9, Ill.	Kanopolis	Evaporated
Reno	The Barton Salt Co.	Hutchinson	Hutchinson	Rock and evaporated
do	The Carey Salt Co.	do	do	Evaporated
do	Morton Salt Co.	120 S. La Salle, Chicago 3, Ill.	do	Evaporated
Rice	American Salt Co.	630 New York Life Bldg., K.C. 6, Mo.	Lyons	Evaporated and rock
Sedgwick	Frontier Chemical Co. of Kansas, Inc.	P.O. Box 545, Wichita	Wichita	Brine

42,600,000 tons valued at \$215,500,000. Known salt reserves amount to more than 5 trillion tons.

All companies producing or preparing to produce salt in Kansas in 1959 are listed in Table 25.

SAND AND GRAVEL

In 1959 Kansas produced 11,334,128 tons of sand and gravel worth \$7,937,205, an increase of 7.1 percent in tonnage and 12.7 percent in value from 1958, when production and value were 10,578,668 tons and \$7,044,966 respectively. With the exception of 1956, when Kansas produced 12,515,164 tons of sand and gravel valued at \$8,022,312, the 1959 production and value were the greatest in the decade. Total production in the decade amounted to 99,400,000 tons valued at \$65,500,000. Of all recorded sand and gravel production since 1865, 50.1 percent (worth 57.9 percent of the total value) was produced in the last decade (Table 26).

TABLE 26.—Sand and gravel sold or used by commercial and noncommercial producers in Kansas, 1958 and 1959

Year	Commercial		Noncommercial		Total sand and gravel		Avg. price per ton
	Short tons	Value	Short tons	Value	Short tons	Value	
1958	8,529,691	\$6,073,020	2,048,977	\$ 971,946	10,578,668	\$7,044,966	.65
1959	9,256,747	6,661,483	2,077,381	1,275,722	11,334,128	7,937,205	
Percent change from 1958 ..					+7.1	+12.7	

Of the 11,334,128 tons of sand and gravel produced in 1959, 81.6 percent or 9,256,747 tons was classified as commercial sand and gravel and 18.4 percent or 2,077,381 tons as noncommercial sand and gravel. In value the commercially produced sand and gravel amounted to \$6,661,483 or 83.8 percent and the noncommercial sand and gravel \$1,275,722 or 16.2 percent of total value. Sand and gravel were produced in 71 counties by 95 commercial operators and at least 46 noncommercial producers, a total of 141 agencies. In 1959, sand and gravel ranked seventh in value among the minerals produced in the state. Most of the sand and gravel was used for paving and building (structural) purposes. Other uses of Kansas sand included fill, filter, engine, railroad ballast, blast, molding, grinding and polishing, hydrafraction, and miscellaneous purposes (Table 27). Wyandotte and Sedgwick

TABLE 27.—*Production of sand and gravel in Kansas, 1958 and 1959, by use*

Use	1958		1959	
	Tons	Value	Tons	Value
Sand:				
Building (structural)	2,831,575	\$2,081,423	3,642,410	\$2,631,741
Paving	4,248,870	2,623,238	3,629,238	2,032,376
Fill .....	.....	.....	666,318	352,504
Filter	10,405	17,056	.....	.....
Engine	37,536	55,548	40,583	70,273
Miscellaneous (construction) .....	.....	.....	34,673	29,830
Railroad ballast .....	.....	.....	79,109	29,031
Blast	*	*	18,140	8,138
Other	841,609	465,975	378,031	228,523
Gravel:				
Paving	2,135,897	1,391,198	2,664,244	2,178,711
Structural	385,566	310,779	325,314	258,135
Other	64,677	102,659	201,252	133,459

* Undistributed, value included with "Other", which also includes molding, grinding and polishing, glass, and hydrafraction sand.

Counties produced 4,204,000 tons of sand and gravel, or 37 per cent of the total.

Sand and gravel reserves are regarded as inexhaustible because the demand for sand and gravel is insignificant compared to the quantity available. Furthermore, sand especially is continually being replaced by new deposits brought in by streams.

Sand and gravel producers that operated in 1959 are listed in Table 28.

TABLE 28.—*Directory of sand and gravel producers on record as of December 31, 1959*

County	Company or operator	Address
Anderson	Anderson Co. Highway Dept.	Garnett
Barber	Barber Co. Highway Dept. M. W. Watson	Medicine Lodge 1004 Nat'l Bank of Topeka Bldg., Topeka
Barton	Barton Co. Highway Dept. Arkansas Sand Co. DuBois Sand Co. Gruber Sand Plant Klepper Sand Co. Moos Bros. Sand Co.	P.O. Box 747, Great Bend 1619 Stone St., Great Bend P.O. Box 172, Great Bend 918 Stone St., Great Bend Claffin P.O. Box 406, Great Bend
Chase	Chase Co. Highway Dept.	Cottonwood Falls
Chautauqua	Chautauqua Co. Highway Dept.	Sedan
Cheyenne	New Era Sand & Gravel Co.	St. Francis
Clark	Clark Co. Highway Dept.	Ashland

TABLE 28.—Directory of sand and gravel producers on record as of December 31, 1959 (continued)

County	Company or operator	Address
Clay	Clay Co. Highway Dept.	Clay Center
	Alsop Sand Co.	Wakefield
	Clay Center Concrete & Sand Co.	Clay Center
Cloud	Cloud Co. Highway Dept.	Concordia
	Earl Beaver Co., Inc.	Gasco
Coffey	Coffey Co. Highway Dept.	Burlington
Comanche	Comanche Co. Road Dept.	Coldwater
Cowley	Cowley Co. Highway Dept.	Winfield
	McFarland Gravel Co.	730 No. D St., Arkansas City
	Myers Materials, Inc.	P.O. Box 911, El Dorado
	Oxford Sand & Gravel Co.	P.O. Box 266, Oxford
	Warren R. Phillips	P.O. Box 50, Winfield
	Wilson Bros.	P.O. Box 59, Route 1, Arkansas City
Decatur	M. W. Watson	1004 Nat'l Bank of Topeka Bldg., Topeka
Dickinson	Shoffner Sand & Gravel Co.	134 E. Jewell St., Salina
Douglas	Bowersock Mills & Power Co.	546 Massachusetts St., Lawrence
Edwards	Showalter Sand & Gravel Co.	Garfield
Elk	Elk Co. Highway Dept.	Howard
Ellis	Lewis C. Schmidtberger	P.O. Box 93, Victoria
Ellsworth	Ellsworth Co. Highway Dept.	Ellsworth
	Henry Milberger	Wilson
	San Ore Construction Co., Inc.	McPherson
	Stoppel Construction Co.	Ellsworth
Finney	Finney Co. Highway Dept.	Garden City
	Sam Alsop Construction Co.	1207 Pinecrest, Garden City
Ford	Davis & Sons Sand Sales	Route 1, Dodge City.
	Dodge City Sand Co.	P.O. Box 430, Dodge City
	Miller Sand & Gravel Co.	Dodge City
Geary	Junction City Sand & Gravel Co.	Route 3, Junction City
	More Sand Co.	626 W. 6th St., Junction City
Gove	Gove Co. Highway Dept.	Gove
	Ray Higbee	Grinnel
Graham	San Ore Construction Co., Inc.	McPherson
Gray	Kerr Sand Co.	Cimarron
Hamilton	Hamilton Co. Highway Dept.	Syracuse
	M. W. Watson	1004 Nat'l Bank of Topeka Bldg., Topeka
	Syracuse Sand & Gravel Co.	107 N. Elizabeth St., Syracuse
Harper	Harper Co. Highway Dept.	Anthony
Haskell	Haskell Co. Highway Dept.	Sublette
	Atchison, Topeka & Santa Fe Rwy.	Topeka
Jackson	Jackson Co. Highway Dept.	Holton
Kearny	Kearny Co. Highway Dept.	Lakin
	Popejoy Sand & Gravel Co.	Ulysses
Kingman	Ray Wells.	Route 1, Kingman
Kiowa	Kiowa Co. Highway Dept.	Greensburg
	Seacat Sand & Excavation Co.	Greensburg
Leavenworth	Leavenworth Co. Highway Dept.	Leavenworth
	Missouri Valley Sand, Inc.	P.O. Box 822, Leavenworth

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County	Company or operator	Address
Lincoln	San Ore Construction Co., Inc.	McPherson
Linn	Linn Co. Highway Dept.	Mound City
Lyon	Wesley Parks	648 Oak St., Emporia
Marshall	Marshall Co. Highway Dept.	Marysville
	Blue River Sand & Gravel Co.	Blue Rapids
	C. V. Garrett	Blue Rapids
	Heinzelman Construction Co.	Marysville
	Hugo P. Vogler	Waterville
McPherson	McPherson Co. Road Dept.	McPherson
Mitchell	Harry Henery, Inc.	P.O. Box 15, Ottawa
Morris	Morris Co. Highway Dept.	Council Grove
	Virgil Metcalf	Route 3, Council Grove
Nemaha	Anderson-Oxandale	P.O. Box 425, Herington
Norton	Norton Co. Highway Dept.	Norton
Osborne	Osborne Co. Highway Dept.	Osborne
Pawnee	Pawnee Co. Highway Dept.	Larned
	Johnson Sand & Gravel Co.	P.O. Box 545, Larned
	Larned Sand & Gravel Co.	P.O. Box 227, Larned
Phillips	D. G. Hansen	Logan
Pottawatomie	Wamego Sand Co.	Wamego
Pratt	Pratt Co. Highway Dept.	Pratt
	Mrs. C. D. Hogard	507 So. Mound St., Pratt
	Miller Sand & Gravel Co.	Route 2, Pratt
Reno	City of Hutchinson Road Dept.	Hutchinson
	Haven Sand Co.	Haven
	J. N. Shears Sons, Inc.	P.O. Box 277, Hutchinson
	J. E. Steele Sand & Gravel Co.	Route 4, Hutchinson
	J. A. Mummey Sand & Gravel Co.	Nickerson
	Fountain Sand Pit	Arlington
Republic	Republic Co. Highway Dept.	Belleville
	Alsop Sand Co.	Wakefield
Rice	Arensman Sand & Gravel Co.	Chase
	Rock Hill Stone & Gravel Co.	P.O. Box 412, Sterling
	A. L. Stapleton	121 N. Logan St., Lyons
	Sterling Sand & Gravel Co., Inc.	P.O. Box 281, Sterling
	Tobias, Wright & Birchenough, Inc.	Lyons
Riley	Walters Sand Co.	P.O. Box 30, Manhattan
Russell	Russell Co. Highway Dept.	Russell
Saline	Central Kansas Sand Co.	Mentor
	Salina Sand Co., Inc.	Mentor
Scott	M. W. Watson	1004 Nat'l Bank of Topeka Bldg., Topeka
Sedgwick	City Engineer, Wichita	Wichita
	Bentley Sand Co.	Bentley
	Big Three Sand & Gravel Co.	3020 W. 21st St., Wichita 12
	Dolese Brothers Co.	13 N.W. 13th St., Oklahoma City, Okla.
	L. C. House Sand Co.	Route 2, Sedgwick
	J & H Sand Co.	4226 Midland St., Wichita
	Walt Keeler Co., Inc.	P.O. Box 1972, Wichita 1
	Miles Sand Service	3925 W. 53rd St., Wichita
	Provence Sand Co.	6600 W. 13th St., Wichita
	Southwest Sand & Gravel Co.	4505 Southwest Blvd., Wichita 15

TABLE 28.—Directory of sand and gravel producers on record as of December 31, 1959 (concluded)

County	Company or operator	Address
Shawnee	Superior Sand Co., Inc.	1717 W. 21st St., Wichita 3
	Vic's Sand & Gravel Co.	Sedgwick
	York Sand Co.	P.O. Box 306, Sedgwick
	Consumers Sand Co.	1101 W. Railroad, Topeka
	Harry Henery, Inc.	P.O. Box 15, Ottawa
	Kansas Sand Co., Inc.	531 N. Tyler St., Topeka
Sheridan	River Sand Co.	P.O. Box 233, Topeka
	Shoffner Sand, Inc.	1939 McAllister St., Topeka
	Victory Sand & Gravel Co.	Box 281, Topeka
Sherman	Sheridan Co. Highway Dept.	Hoxie
	Carl Kaiser	Grainfield
Smith	Sherman Co. Highway Dept.	P.O. Box 22, Goodland
	Harry Henery, Inc.	P.O. Box 15, Ottawa
Stafford	Smith Co. Highway Dept.	Smith Center
	Stafford Co. Highway Dept.	St. John
Sumner	Partin Sand & Gravel Co.	P.O. Box 274, Stafford
	Sumner Co. Engineering Dept.	Wellington
Thomas	Mulvane Sand Co., Inc.	503 E. Mulvane St., Mulvane
	Thomas Co. Road Dept.	Colby
	Harry Henery, Inc.	P.O. Box 15, Ottawa
	Joe Hubbard	Colby
	Purma Drag Line Co.	975-2nd St., Colby
Trego	San Ore Construction Co., Inc.	McPherson
	Trego Co. Highway Dept.	WaKeeney
Wabaunsee	Wabaunsee Co. Highway Dept.	Alma
	Wallace Co. Highway Dept.	Sharon Springs
Wallace	Harry Henery, Inc.	P.O. Box 15, Ottawa
	Washington Co. Highway Dept.	Washington
Washington	Finlayson Gravel	Barnes
	Mueller Sand & Gravel Co.	Hanover
	Wilson Co. Highway Dept.	Fredonia
Wilson	American Sand & Gravel Co.	5731 Kansas Ave., Turner
	Builders Sand Co.	P.O. Box 658, Argentine Sta., Kansas City 6
Wyandotte	Dreyer Sand Co.	Turner
	Happe Sand Co.	5411 Birch St., Mission
	Holliday Sand & Gravel Co.	2 West 40th St., Kansas City 11, Mo.
	Peck-Woolf Sand & Materials Co.	1920 Paseo Blvd., Kansas City 8, Mo.
Various	Stewart Sand & Materials Co.	4049 Penn. Ave., Kansas City 11, Mo.
	Superior Sand & Gravel Co.	P.O. Box 106, Edwardsville
	Sand, Inc.	1313 West 31, South Wichita 13

STONE

Stone, fourth most important mineral commodity in Kansas in 1959, showed a gain of 11.8 percent in quantity and 13.5 percent in value compared to 1958. Total stone production in 1959 amounted to 13,987,952 tons, an increase of 1,482,892 tons. Value of the 1959 production was \$17,072,506 or \$2,033,121 more than the previous year's production (Table 27). Stone produced was limestone, sandstone, and chat (chert). The last is associated with the metal mining industry of the Tri-State Lead and Zinc District in southern Cherokee County. In the tables, chat is included under "miscellaneous" stone.

By far the largest part of the stone produced in the state was limestone that was crushed and used for concrete and road metal, 9,250,215 tons, valued at \$11,847,532. Next in importance quantitatively was stone used for making portland and masonry cement, followed by railroad ballast, riprap, agricultural, and dimension stone. On the basis of value, stone for concrete and road metal was first (\$11,914,147), then cement (\$2,719,245), agri-

TABLE 29.—*Production and value of stone in Kansas, by kind of rock and use, 1958 and 1959*

	1958		1959	
	Tons	Value	Tons	Value
Limestone:				
Concrete and road metal	7,619,141	\$ 9,824,504	9,250,215	\$11,847,532
Cement	2,464,135	2,464,135	2,810,559	2,719,245
Riprap	588,437	471,882	379,990	340,375
Dimension stone	51,019	530,345	39,004	502,863
Agricultural	288,213	430,584	352,759	545,766
Railroad ballast	31,800	31,981	33,746	34,892
Other or miscellaneous ..	506,531	863,949	489,911	856,712
Total limestone	11,549,276	\$14,617,410	13,356,184	\$16,847,385
Sandstone:				
Railroad ballast	*	*	*	*
Concrete and road metal	*	*	*	*
Riprap	26,190	\$ 38,800	*	*
Other (including dimension stone)	*	*	*	*
Miscellaneous:				
Railroad ballast	572,949	\$ 205,829	456,104	\$ 158,506
Concrete and road metal	355,925	177,346	175,664	66,615
Total miscellaneous	928,874	\$ 383,175	631,768	\$ 225,121
Total stone†	12,504,340	\$15,039,355	13,987,952	\$17,072,506

* Included under "Undistributed" in Table 1.

† Does not include items marked by asterisk.

cultural limestone (\$545,766), dimension stone (\$502,863), riprap (\$340,375), and railroad ballast (\$193,398). In 1959, stone used for concrete and road metal, cement, and agricultural limestone showed increases from 1958; stone used for riprap, railroad ballast, and dimension stone showed decreases. A summary of Kansas stone production and value, by kind of rock and use, for 1958 and 1959, is presented in Table 29.

The stone reserves of Kansas are extremely large and for practical purposes may be regarded as inexhaustible.

Stone was produced in Kansas in 1959 by 71 commercial companies operating 104 quarries in 41 counties and by at least 26 noncommercial operators, principally county highway departments, producing stone at 26 sites in 21 counties. Greatest activity in the stone industry centered in Wyandotte, Johnson, Dickinson, and Elk Counties, which produced 4,147,146 tons of stone (29.6 percent of all stone produced) valued at \$5,174,137 (30.3 percent of the total value). Wyandotte, Allen, Neosho, Johnson, Wilson, Dickinson, Elk, and Montgomery Counties produced 63.8 percent of the limestone, Bourbon and Lincoln Counties all of the sandstone, and Cherokee County was the sole producer of chat. Dimension limestone production was confined to Cowley, Geary, Neosho, and Pottawatomie Counties and dimension sandstone to Bourbon County.

A directory of stone producers operating in Kansas in 1959 is given in Table 30.

TABLE 30.—Directory of stone producers on record as of December 31, 1959

County	Company or operator	Address
Allen	Allen Co. Highway Dept.	Iola
	Lehigh Portland Cement Co.	Iola
	Monarch Cement Co.	Humboldt
Anderson	Nelson Bros. Quarries	La Harpe
	Hunt Rock Co.	Garnett
Atchison	Murray Limestone Products Co.	Centerville
	Atchison Co. Highway Dept.	Atchison
	Ralph Bromley & Sons Quarries	Atchison
Bourbon	Geo. W. Kerford Quarry Co.	Atchison
	Bandera Stone Quarry	Redfield
	Bourbon Co. Highway Dept.	Fort Scott
	Cullor Limestone Co.	R.F.D. 5, Fort Scott
Butler	Fort Scott Hydraulic Cement Co.	P.O. Box 267, Fort Scott
	Myers Material, Inc.	P.O. Box 911, El Dorado
Chase	Riddle Quarries, Inc.	Nat'l Bank of America Bldg., Salina
	Sedan Limestone Co.	Sedan
Chautauqua	Baxter Chat Co.	Baxter Springs
	Eagle-Picher	Miami, Okla.

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TABLE 30.—*Directory of stone producers on record as of December 31, 1959*
(continued)

County	Company or operator	Address
	C. Y. Semple	P.O. Box 390, Baxter Springs
	Southwest Chat Co., Inc.	Baxter Springs
	Southwest Rock & Chat Co.	Baxter Springs
	John J. Stark	P.O. Box 7, Girard
	Lee R. Thomas, Agt.	Baxter Springs
Clay	Riddle Quarries, Inc.	Nat'l Bank of America Bldg., Salina
Coffey	Jones Rock Co.	P.O. Box 128, Emporia
	Neosho Valley Rock Co.	Burlington
Cowley	John V. Elam	Winfield
	C. L. Daniels Stone Co.	P.O. Box 134, Winfield
	Silverdale Cut Stone Co.	Silverdale
	Silverdale Limestone Co.	Route 3, Box 180, Arkansas City
Crawford	John J. Stark	Box 7, Girard
Dickinson	Anderson-Oxandale	Box 425, Herington
	Riddle Quarries, Inc.	Nat'l Bank of America Bldg., Salina
Doniphan	U.S. Corps of Engineers	1800 Federal Office Bldg., Kansas City 6, Mo.
	Everett Quarries, Inc.	Plattsburg, Mo.
	Geo. W. Kerford Co., Inc.	Atchison
	Wolf River Limestone, Inc.	Troy
Douglas	Palmyra Township Highway Dept.	Baldwin
Elk	Concrete Materials Const. Co.	Moline
Ellis	City of Ellis Highway Dept.	Ellis
	Ellis Co. Highway Dept.	Hays
Franklin	Franklin Co. Highway Dept.	Ottawa
	Dan Fogle	Ottawa
Geary	Grosshans-Peterson, Inc.	Marysville
	Walker Cut Stone Co.	P.O. Box 269, Junction City
Greenwood	Greenwood Co. Highway Dept.	Eureka
	Sedan Limestone Co.	Sedan
Jackson	Anderson-Oxandale	Box 425, Herington
	G. W. Baker	Holton
	Reno Construction Co.	P.O. Box 61, Overland Park
Jefferson	Roy Baker	Valley Falls
	N. R. Hamm Quarry, Inc.	Perry
Jewell	Ideal Cement Co.	Superior, Nebr.
Johnson	Deitz Hill Development Co.	28 SW Blvd., Kansas City 10, Mo.
	Johnson Co. Highway Dept.	Olathe
	Reno Construction Co.	P.O. Box 61, Overland Park
	J. A. Tobin Construction Co.	3701 Rainbow Blvd., Kansas City
Labette	Labette Co. Highway Dept.	Oswego
	John J. Stark	Box 7, Girard
Leavenworth	Kansas State Penitentiary	Lansing
	U.S. Corps of Engineers	1800 Federal Office Bldg., Kansas City 6, Mo.
	J. C. Haigwood	Tonganoxie
	Loring Quarries, Inc.	P.O. Box 174, Bonner Springs

TABLE 30.—Directory of stone producers on record as of December 31, 1959
(concluded)

County	Company or operator	Address
Lincoln	Quartzite Stone Co.	Lincoln
Linn	Lee Giles	Greeley
	Murray Limestone Products	Centerville
Lyon	City of Emporia Highway Dept.	Emporia
Marion	Walt Keeler Co., Inc.	P.O. Box 1972, Wichita 1
	Riddle Quarries, Inc.	Nat'l Bank of America Bldg., Salina
Marshall	R. Hopper Brothers Quarry	Pawnee, Nebr.
	Swanson Construction Co.	Frankfort
Miami	Miami Co. Highway Dept.	Paola
	A. J. Forster	Paola
	L. W. Hayes, Inc.	4550 Main St., Kansas City 2, Mo.
Montgomery	City of Coffeyville	Coffeyville
	Montgomery Co. Highway Dept.	Independence
	H & S Rock Co.	R.F.D. 1, Elk City
	Universal Atlas Cement Co.	100 Park Ave., New York 17, N.Y.
Morris	Anderson-Oxandale	Box 425, Herington
Neosho	Neosho Co. Highway Dept.	Erie
	Anderson-Oxandale	Box 425, Herington
	Ash Grove Lime-Portland	101 W. 11th Street, Kansas City, Mo.
	Harry Byers & Sons, Inc.	500 N. Plummer, Chanute
	Joe O'Brian Rock Crusher	St. Paul
Osage	Clark Rock Quarry	Baldwin
Pottawatomie	Anderson-Oxandale	Box 425, Herington
	Bayer Stone Co., Inc.	509 Yuma St., Manhattan
Rice	Riddle Quarries, Inc.	Nat'l Bank of America Bldg., Salina
Riley	Bayer Construction Co.	509 Yuma St., Manhattan
Sedgwick	Wichita Highway Dept.	City Building, Wichita
Shawnee	Geo. W. Kerford Co., Inc.	Atchison
	Henry C. Luttjohann	2001 James St., Topeka
	Netherland Stone Co.	Route 2, Topeka
Wabaunsee	Wabaunsee Co. County Engineer	Alma
Wilson	Benedict Rock & Lime Co.	Benedict
	Carr Rock Products Co.	315 N. 8th St., Neodesha
	General Portland Cement Co.	111 West Monroe St., Chicago 3, Ill.
Woodson	Nelson Brothers Quarries	La Harpe
Wyandotte	American Rock Crusher	3700 Rainbow Blvd., Rosedale
	Lone Star Cement Corp.	1650 Dierks Bldg., Kansas City 6, Mo.
	Peerless Quarries, Inc.	Turner
	Thompson-Strauss Quarries, Inc.	700 Holliday Drive, Kansas City
	J. A. Tobin Construction Co.	3701 Rainbow Blvd., Kansas City
Various	Concrete Materials & Construction Co.	Moline

METALS

Lead and zinc are the only metals mined in Kansas; four mines operated by four producers and several gougers in the southeast corner of Cherokee County, in the extreme southeast part of the state, produced lead and zinc. In 1959 the value of metals produced was only \$344,540 as compared to \$1,205,850 in 1958, a decrease of 71.5 percent. The metals contributed only 0.07 percent of the value of all minerals produced in the state (Table 4, Fig. 3).

LEAD

Since 1956, when Kansas produced 7,635 tons of recoverable lead valued at \$2,397,390, lead production and value have progressively declined; 1959 production of 481 tons was valued at \$110,630, decreases of 63 and 63.6 percent respectively from 1958 (Table 31). Only four lead mines, operated by four companies and several gougers, produced lead in 1959 as compared to 25 in the previous year. Currently lead mining in Kansas is at the lowest ebb in the history of metal mining in the state.

TABLE 31.—*Quantity and value of lead and zinc produced in Kansas, 1958 and 1959*

	Recoverable lead		Recoverable zinc	
	Tons	Value	Tons	Value
1958	1,299	\$303,966	4,421	\$901,884
1959	481	110,630	1,017	233,910
Percent change from 1958	-63.0	-63.6	-77.0	-74.1

The Red Lead and Zinc Company of Baxter Springs was the principal lead producer in 1959, replacing the Eagle-Picher Mining and Smelting Company of Miami, Oklahoma, which ranked second, followed by Ora-Black of Cardin, Oklahoma. The only lead smelter operated in Kansas was the Eagle-Picher Mining and Smelting Company at Galena, Cherokee County. This company produced pigments and sulfuric acid. Lead pigments were also produced at Coffeyville, Montgomery County, by the Ozark Smelting & Mining Company. Mining equipment, facilities, and most of the leases in the Baxter Springs area of the National Lead Company of Fredericktown, Missouri, were acquired by the Eagle-Picher Mining and Smelting Company. National Lead Company also dismantled its Ballard No. 8 mill, moving it to southeastern Missouri.

Data on lead production in Kansas in 1958 and 1959 are presented in Table 31. Table 32 is a directory of lead producers in Kansas on record as of December 31, 1959.

TABLE 32.—Directory of lead and zinc producers in Kansas on record as of December 31, 1959

Company	Address	Mine*
Ora-Black	Cardin, Oklahoma	Lindsey
The Eagle-Picher Mining and Smelting Company	Miami, Oklahoma	Bird Dog
National Lead Company	Fredericktown, Missouri	Ballard
C. H. Rea	Baxter Springs	Robinson
Gougers	.....	Various

* All lead and zinc mines are in Cherokee County.

ZINC

Zinc, like lead, experienced a decided setback in production and value in 1959 when compared to 1958 and the entire 1950-59 decade. In 1959, Kansas produced 1,017 tons of recoverable zinc as compared to 4,421 tons in 1958, a decrease of 77 percent. Value of the recoverable zinc in 1959 was \$233,910 compared to \$901,884 in 1957, a decrease of 74.1 percent. The same companies that produced lead produced zinc in 1959.

The Cherryvale Zinc Company operates a smelting plant at Cherryvale, Montgomery County.

Data on zinc production in Kansas in 1958 and 1959 are given in Table 31 and a directory of zinc producers on record as of December 31, 1959, is presented in Table 32.

UNDISTRIBUTED MINERALS

Kansas produced several minerals that are classified as "undistributed". Undistributed mineral commodities are those whose total quantity and value cannot be revealed, because they are produced almost exclusively by one company. Such minerals in 1959 include diatomaceous marl, gypsum, natural cement, salt brine, volcanic ash or pumicite, and dimension sandstone. In addition, expanded perlite and expanded vermiculite were processed from material shipped into Kansas from outside sources. The total value of undistributed minerals in Kansas in 1959 amounted to \$4,152,905.

CEMENT (NATURAL)

Production and shipments of natural cement in 1959 in Kansas were approximately 35 percent less than in 1958. In value shipments declined approximately 50 percent. The only producer of natural cement in Kansas is the Fort Scott Hydraulic Cement Company of Fort Scott, Bourbon County. This company has been in operation continuously since 1887 and is one of eight natural cement companies in the United States. The raw materials for cement are obtained from "cement" rock, or Blackjack Creek Limestone, the basal unit of the Fort Scott Limestone formation, Marmaton Group. Reserves of natural cement rock are practically unlimited. The value of 1959 shipments of natural cement is included in the value listed under "Undistributed" in Table 1.

DIATOMACEOUS MARL

Production of diatomaceous marl in 1959 was approximately 4 percent less than in 1958. Diatomaceous marl, first discovered in Kansas about 1929 in Wallace and Logan Counties, is produced solely in Wallace County by the National Lead Company, DeLore Division, 2800 Carondelet Station, St. Louis, Missouri. Mining of the marl started in 1949 but it was not until mid-summer of 1953 that the company opened its plant at Edson, about 17 miles north of the mine, for processing and shipping. Since 1953, production and value have fluctuated very little. Because there is only one producer of diatomaceous marl in Kansas, production and value data may not be revealed. Value of the diatomaceous marl is included in the total listed under "Undistributed" in Table 1. The Kansas diatomaceous marl is used for the manufacture of whiting substitute and as a paint filler. Reserves of diatomaceous marl are estimated to exceed 1 million tons.

GYPSUM

Crude gypsum production in Kansas in 1959 was approximately 21 percent greater than in 1958 and calcined gypsum showed an increase of 17 percent. Percentage increases in value of crude and calcined gypsum in 1959 were significantly greater than percentage increases in production. In 1959 the value of

crude gypsum increased 86 percent and of calcined gypsum 72 percent. The value of the crude gypsum produced is included under the value assigned to the "Undistributed" minerals (Table 1).

Gypsum is produced in Barber and Marshall Counties. Producers on record at the end of 1959 are listed in Table 33. The reserves of gypsum are known to be extensive; they are sufficient to maintain production at the present rate for many years.

TABLE 33.—Directory of Kansas producers of gypsum in 1959

County	Company	Office address	Mine or plant
Barber	National Gypsum	325 Delaware Ave., Buffalo, N.Y.	Medicine Lodge
Marshall	Bestwall Gypsum	120 E. Lancaster, Ardmore, Penn.	Blue Rapids

EXPANDED PERLITE AND VERMICULITE

Expanded perlite and vermiculite are processed in Kansas from raw materials imported from other states. In 1959 the quantity of expanded vermiculite sold was greater by 55.5 percent than in 1958 and the value greater by 24.6 percent. Survey records on expanded vermiculite date back to 1954, when the quantity sold was 9.1 percent greater than in 1959. Greatest quantity sold was in 1956, when the quantity sold was approximately 20.8 percent more than in 1959.

Perlite tonnage and value in 1959 were less than in 1958 by approximately 43 and 16 percent respectively. The 43 percent decline in perlite tonnage is the greatest decline recorded since 1953, the first year of the Survey's record. On the other hand, the 16 percent decrease in the value of expanded perlite processed in 1959 is, with the exception of 1956, the least annual decline recorded by the Survey. A considerable increase in the price per ton of the processed perlite in 1959 is indicated.

Expanded perlite is processed by Panocalite Perlite, Inc., of Kansas City, Wyandotte County, and expanded vermiculite by the Dodson Manufacturing Company of Wichita. Values of perlite and vermiculite for 1959 are included in the total listed under "Undistributed" in Table 1. Among the uses of expanded perlite processed in Kansas are building plaster, concrete aggregate, soil conditioners, and filter aids. Expanded vermiculite is used primarily for concrete roof deck and floors and for insulation.

PUMICITE OR VOLCANIC ASH

Production and value of volcanic ash in Kansas, formerly the most important state in the production of pumicite or volcanic ash, have declined to the point where they are negligible. Production in 1959 was 0.7 percent greater than in 1958 but value was 14.6 percent less. Only two producers of volcanic ash operated in 1959, the same as in the previous year. On the basis of information available, Kansas has produced a minimum cumulative total of 1,303,000 tons of volcanic ash from the time when production first started in 1910 until the end of 1959. The value of this volcanic ash is estimated at \$4,500,000. Production and value of volcanic ash in the 1950-59 decade are estimated at 52,000 tons and \$270,000 respectively (Table 35). The greatest production in the decade was in 1954, when 21,000 tons of volcanic ash was used in the rebuilding of Kansas highways.

Volcanic ash is known to occur at 160 localities in 39 counties. Currently, however, production is limited to Lincoln and Norton Counties. Extensive deposits of the ash are found in Meade County, which until 1956 produced the greatest amount of ash in the state. In 1956 the Cudahy Packing Company of Omaha, Nebraska, ceased mining operations at Meade and disposed of their properties to the Purex Corporation, Ltd., of Meade.

Kansas volcanic ash has been used as an abrasive, especially in scouring compounds and soaps; as an ingredient of ceramic glazes and ceramic bodies; as an additive to cement; as a raw material for manufacture of several types of lightweight aggregate, cellular blocks, and glass; as a sweeping compound; as a dressing for bituminous-matt roads; and as an inert filler (Carey and others, 1952, p. 3).

Most recent estimate of Kansas usable volcanic ash reserves is for 1952 (Carey and others, 1952, p. 40) when they were estimated at 20 million tons. Producers on record for 1959 are listed in Table 34.

TABLE 34.—*Directory of Kansas producers of volcanic ash or pumicite in 1959*

County	Company	Office address	Pit location (nearest town)
Lincoln	Ernest Hauzlicek	Wilson	Wilson
Norton	Wyandotte Chemical Corporation	1609 Biddle Ave., Wyandotte, Mich.	Calvert

SALT BRINE

Salt brine for industrial use is produced by the Frontier Chemical Company of Kansas, Inc., Wichita, a division of the Vulcan Materials Company of Birmingham, Alabama. Although production of salt brine in 1959 was only 3.6 percent greater than in 1958, its value was approximately 145 percent greater than in the previous year. Salt brine production and value have steadily increased from 1955, the first year of production. Value of the salt produced is included in the total listed under "Undistributed" in Table 1. The salt obtained from brine pumped from the company's wells in Sedgwick County is used in the manufacture of industrial chemicals.

SANDSTONE (DIMENSION)

Dimension sandstone was produced by the Bandera Stone Quarry Company of 222 West 72nd Street, Kansas City, Missouri. The quarry is located near Redfield, Bourbon County. In 1959, production declined 34 percent and value declined 27 percent. The Bandera sandstone is used for building stone, including rough construction stone, sawed stone, and flagging stone. Value of dimension sandstone is included in the total listed under "Undistributed" in Table 1.

Data on hand on production and value of dimension sandstone in Kansas are incomplete and hence no analysis of trends in the dimension sandstone industry in the 1950-59 decade is made.

UNEVALUATED MINERAL RESOURCES

WATER AND SOIL

Two of the most important mineral resources of Kansas are water, both surface and underground, and soil. Water and soil are truly mineral commodities, but because of their nature and universal usage are difficult to evaluate as to quantity and value. Water, to a considerable extent, is a replenishable resource in that water supplies may be completely replenished in some geologic situations and only partly replenished in others. Soil lost by erosion is replaced only by slow soil-building processes. No data are at hand at present in regard to the actual quantity of soil that

exists in Kansas. Without the soil that covers the 82,113 square miles of land surface (total area including water surface is 82,276 square miles), Kansas could not have produced \$1 billion to \$1.5 billion worth of agricultural products including livestock each year since 1950. The amount of available water and the quantity used or consumed in the state in 1953 were estimated by the Kansas Water Resources Fact-Finding and Research Committee in 1954. According to the survey, a total of 1,898 mgd (million gallons a day) was withdrawn from the available water resources, but the amount consumed and removed from the supply for all purposes amounted to 652 mgd, or 237,980 millions gallons per year. The actual value of the 237,980 million gallons consumed per year is not known. It is estimated (Foley, Smrha, and Metzler, 1955, p. 1) that city dwellers pay an average of only about \$5 a year each for water, and rural residents somewhat less. On the assumption that 51 percent of the population is urban and 49 percent rural, the minimum value of water consumed is computed to be about \$9,000,000 a year. This sum, however, does not include the value of water consumed by industry, which is estimated to pay an additional \$27,000,000 a year, or about three-fourths of the state's water bill. The figures cited are not intended to be exact, but they do suggest the magnitude of the value of water consumed in Kansas each year.

UNEXPLOITED MINERALS

In addition to the minerals produced, there are other mineral commodities in Kansas that either have never been exploited or are not at present being produced on a commercial scale. Such minerals include aluminum from clays (Kinney, 1943, 1952), bentonite (Kinney, 1942; Ives and Hill, 1960), chalk (Runnels and Dubins, 1949), of which the state has virtually unlimited supplies, iron (Jewett and Schoewe, 1942, p. 103), limestone for the manufacture of lime (Ives and Runnels, 1960), magnesium (Schoewe, 1943; Jeffords, 1948), mineral water (Schoewe, 1953, p. 133), oil shale (Runnels and others, 1952), phosphate nodules (Runnels, 1949; Runnels and others, 1953), pyrite (Jewett and Schoewe, 1942, p. 168), rock asphalt (Jewett, 1940), and tripoli (Jewett and Schoewe, 1942, p. 168). Still other minerals are known to occur in Kansas, such as germanium (Schleicher and Hambleton, 1954; Schleicher, 1959), and uranium (Runnels, Sch-

leicher, and Van Nortwick, 1953), but these have not been investigated sufficiently to show whether they exist in commercial quantities. Further study of these unexploited minerals in Kansas coupled with favorable economic conditions may eventually result in the production of some, if not all, of these mineral commodities.

REVIEW OF MINERAL PRODUCTION IN KANSAS, 1950-1959

In Kansas the 1950-59 decade is outstanding for the value of minerals produced. Of the total value of all minerals produced, 85.2 percent was received for mineral fuels—coal, gas, liquefied petroleum gases, and oil, and the associated products carbon black and helium; 13.2 percent for the nonmetals exclusive of fuels; and 1.6 percent for the metals (Fig. 4). Especially noteworthy is the fact that sales in the last decade are such a large fraction of the total cumulative income for almost a century of exploitation of minerals. Value of all minerals produced in the last decade is 45.9 percent of the cumulative total; value of mineral fuels is 48.7 percent of the cumulative total of mineral fuels; value of other nonmetals is 40.9 percent of the cumulative total; and of metals is 13 percent (Table 35, Fig. 5).

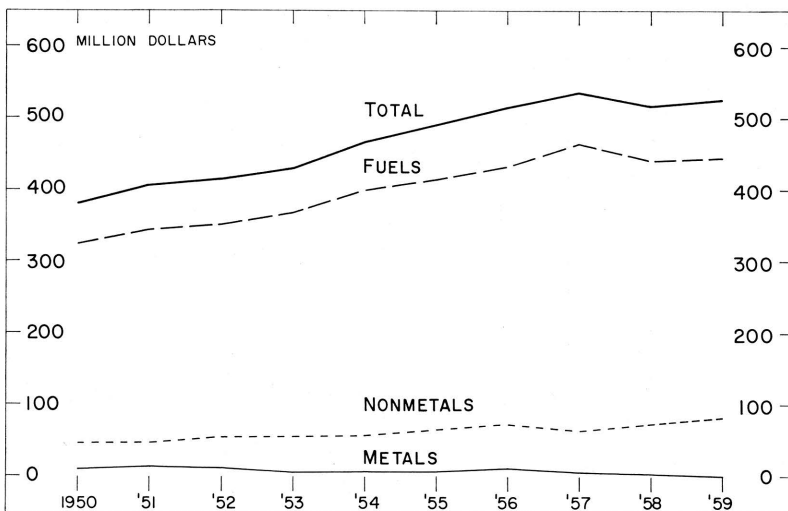


FIG. 4—Trend of value of minerals produced in Kansas, 1950-59.

TABLE 35.—Quantity and value of mineral production, by commodity, for 1950-1959 decade and total cumulative, in part estimated.

Commodity	First record	1950-59		Cumulative to end 1959	
		Quantity	Value	Quantity	Value
Carbon black, lb.	1937	857,700,000	\$ 48,400,000	1,956,000,000	\$ 101,000,000
Cement, 376-lb. bbl.	1868	91,593,000	248,568,000	300,482,000	554,145,000
Clay, ton	1892	^a	89,100,000	^a	202,000,000
Coal, ton	1869	13,122,300	54,323,500	279,480,000	576,900,000
Gypsum, ton ^b	1889	^e	^e	8,339,000	11,000,000
Helium, cu. ft.	1903	319,160,100	4,735,104	^c	^c
Lead, ton	1876	50,900	15,214,000	643,900	87,630,000
Natural gas, M cu. ft.	1886	4,740,000,000	467,600,000	8,000,000,000	870,000,000
L.P. gases, 42-gal. bbl.	1913	48,000,000	117,000,000	82,000,000	187,000,000
Petroleum, 42-gal. bbl.	1889	1,177,500,000	3,294,500,000	3,130,000,000	6,350,000,000
Salt, ton	1887	8,870,000	83,925,000	42,600,000	215,500,000
Sand and gravel, ton	1865	99,400,000	65,500,000	198,000,000	113,000,000
Stone, ton	1865	105,200,000	128,400,000	166,900,000	225,000,000
Volcanic ash, ton	1910	52,000	270,000	1,303,000	4,500,000
Zinc, ton	1876	193,760	55,857,000	2,850,000	412,800,000

^a Data indeterminate; clay used in cement not segregated in early reports.

^b Estimated data.

^c Complete data not available.

^d Since 1919 only; earlier data not available.

^e Fewer than three producers; data may not be revealed.

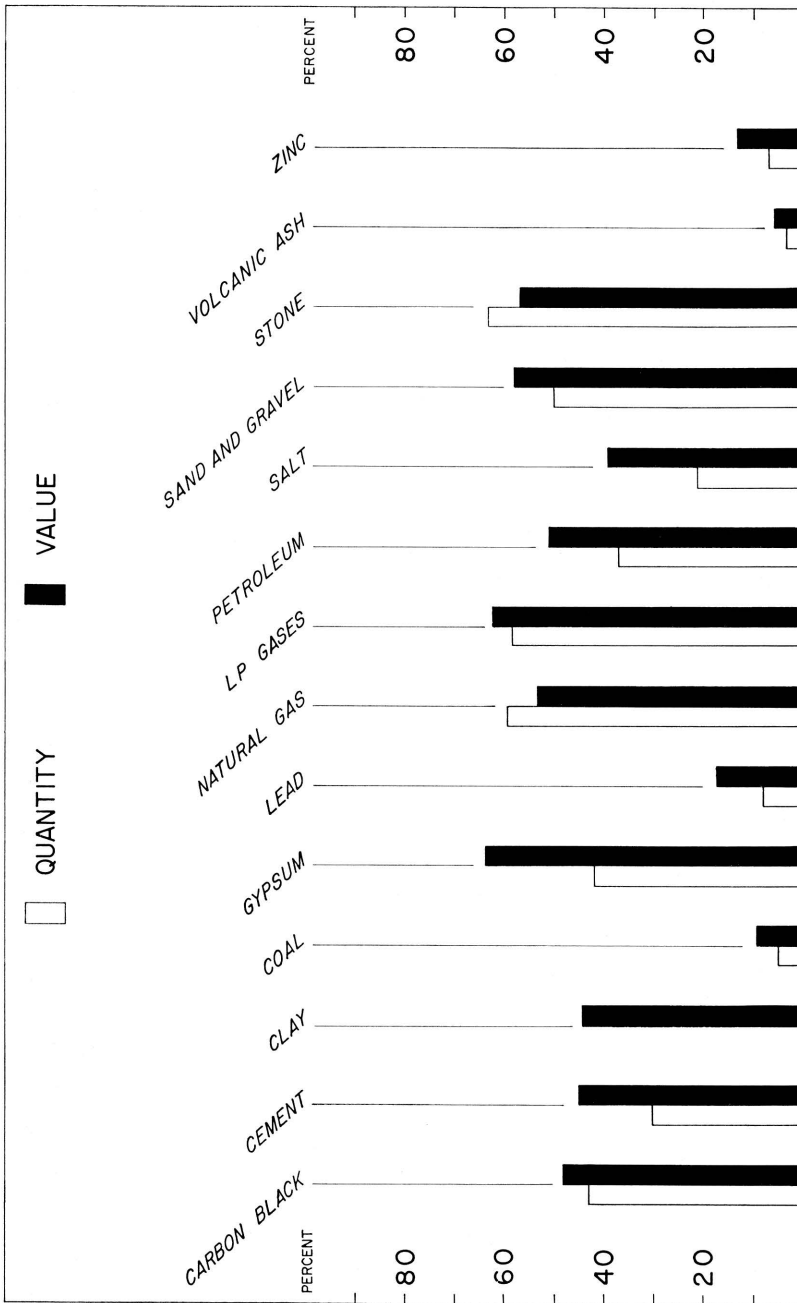


FIG. 5—Quantity and value of individual minerals produced in Kansas, 1950-59, as percentage of cumulative production, 1865-1959.

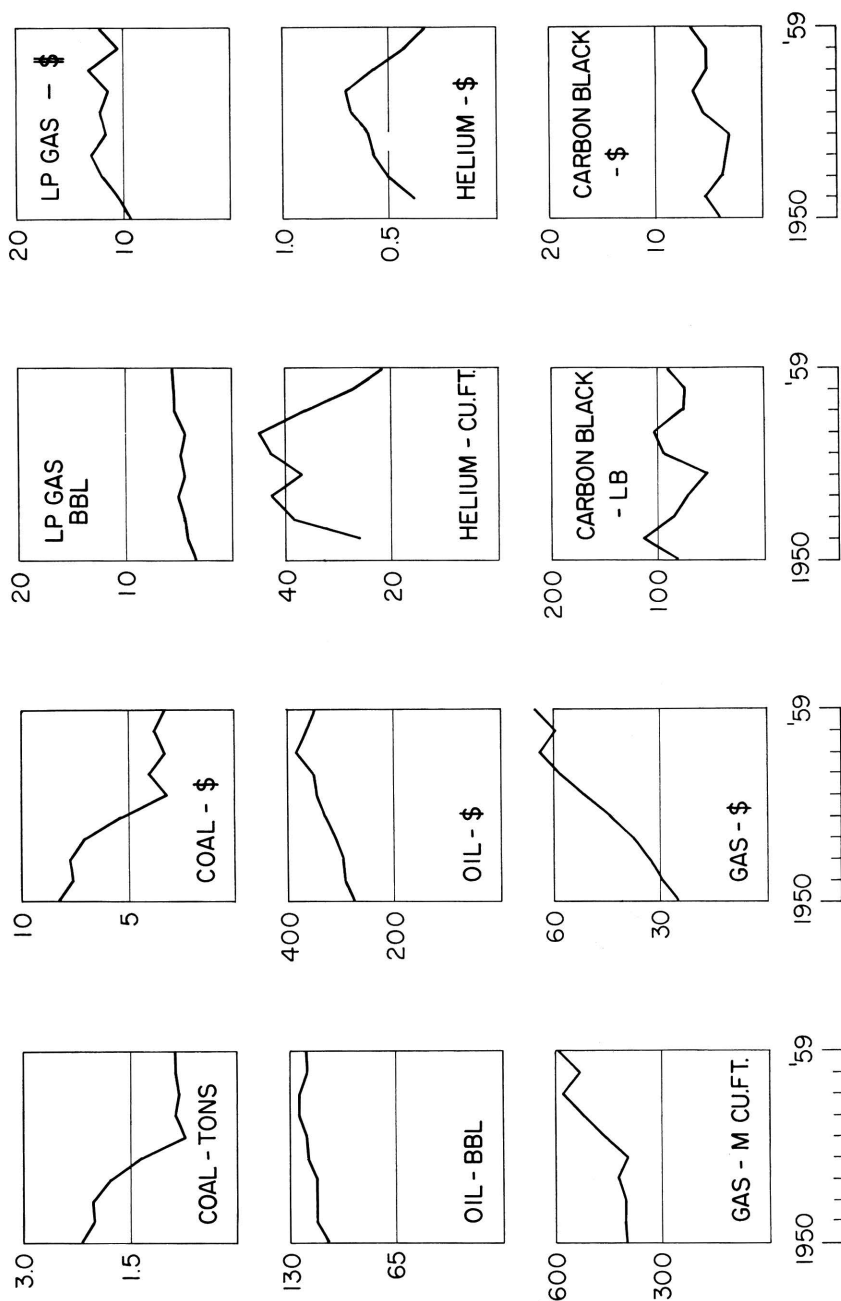


FIG. 6.—Trend of quantity and value of mineral fuels and associated products produced in Kansas, 1950-59.

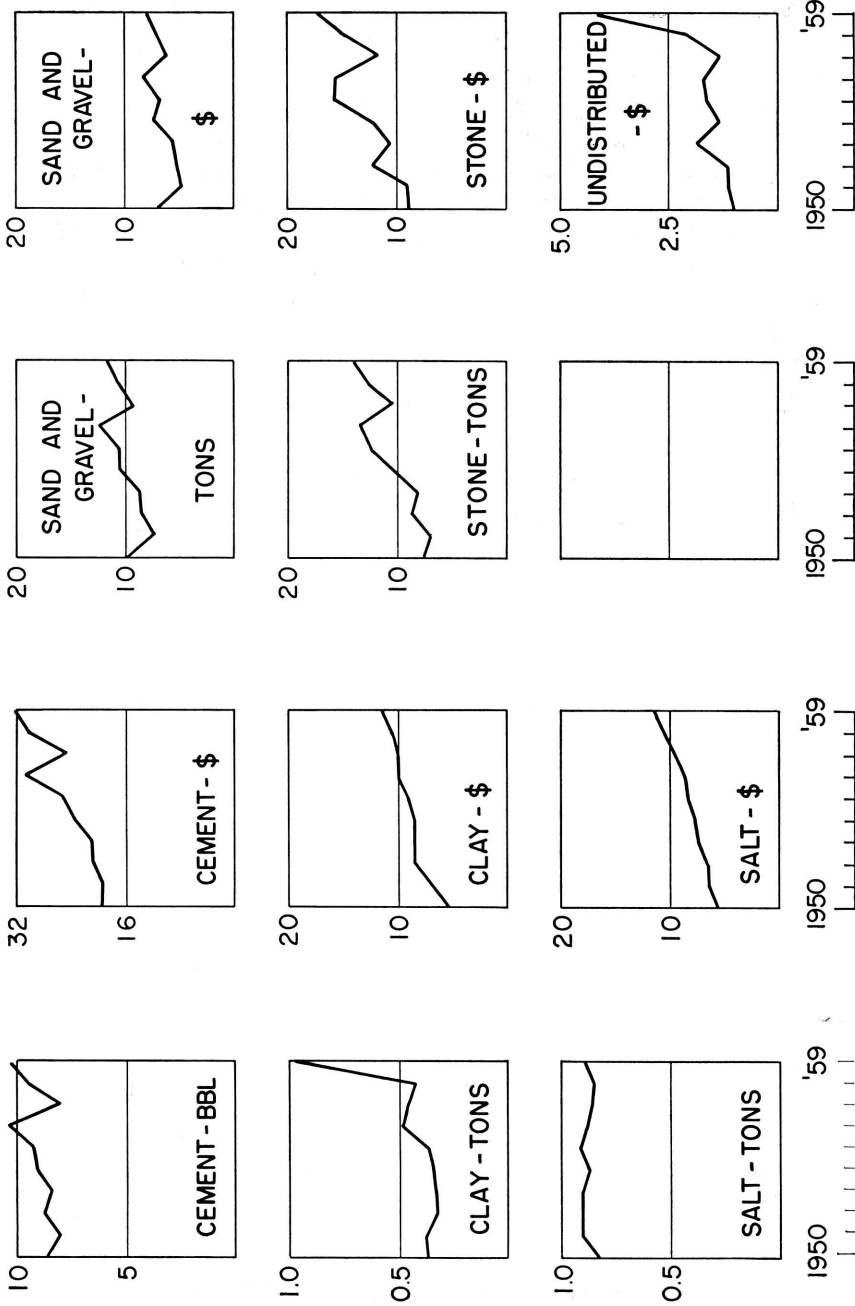


FIG. 7.—Trend of quantity and value of nonmetallic minerals produced in Kansas, 1950-59.

Table 35 presents a summary of the 1950-59 decade of quantity and value of mineral production, by commodity, with comparison to the cumulative quantity and value since production first started, based upon recorded and estimated data. Values of all mineral commodities except the metals (lead and zinc), coal, volcanic ash, and salt produced in 1950-59 exceed 40 percent of the cumulative value of these minerals, and value of salt approaches 40 percent. The trends of mineral production and value of the more important mineral commodities produced in the state in 1950 through 1959 are shown graphically in Figures 6, 7, and 8.

What the future decades may bring forth in the mineral industry in Kansas is, to be sure, unpredictable. It seems reason-

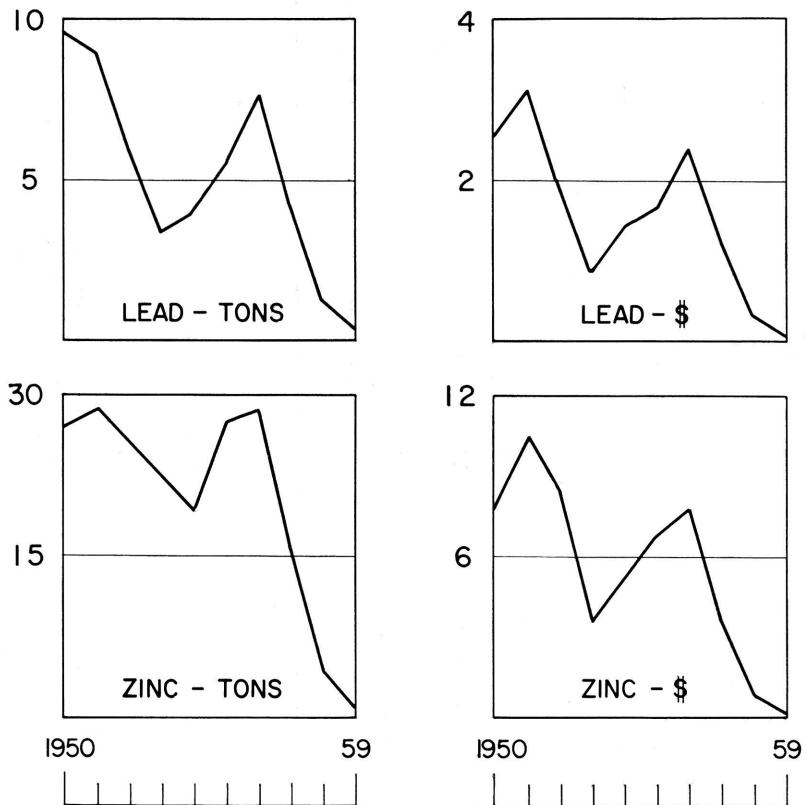


FIG. 8—Trend of quantity and value of metals produced in Kansas, 1950-59.

able to assume, however, from data relative to mineral production and value for the 1950-59 decade (Fig. 4), that the mineral industry in the state is becoming stabilized. The current trend is toward a leveling off in the fuels category as shown especially by the decline in oil production and value during the last two years of the 1950-59 decade, a slow upward trend in the non-metals, and a standstill or a very slow and insignificant rise in the metals.

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BULLETIN 134

1959 REPORTS OF STUDIES

- PART 1. DESCRIPTION OF A DAKOTA (CRETACEOUS) CORE FROM CHEYENNE COUNTY, KANSAS, by D. F. Merriam, W. R. Atkinson, Paul C. Franks, Norman Plummer, and F. W. Preston, p. 1-104, fig. 1-13, pl. 1-4, April 15, 1959.
- PART 2. CEMENT RAW MATERIALS IN KANSAS, by Russell T. Runnels, p. 105-124, fig. 1-5, May 1, 1959.
- PART 3. SANDSTONES OF THE DOUGLAS AND PEDEE GROUPS IN NORTHEASTERN KANSAS, by Donald T. Sanders, p. 125-159, fig. 1-5, pl. 1-2, May 15, 1959.
- PART 4. GERMANIUM IN KANSAS COALS, by John A. Schleicher, p. 161-179, fig. 1-2, May 15, 1959.
- PART 5. COAL RESOURCES OF THE CHEROKEE GROUP IN EASTERN KANSAS. I. Mulky Coal, by Walter H. Schoewe, p. 181-222, fig. 1-6, pl. 1-6, June 1, 1959.
- PART 6. CROSS-STRATIFICATION, DAKOTA SANDSTONE (CRETACEOUS), OTTAWA COUNTY, KANSAS, by Paul C. Franks, George L. Coleman, Norman Plummer, and W. Kenneth Hamlin, p. 223-238, fig. 1-3, pl. 1-2, August 1, 1959.
- PART 7. THE MINERAL INDUSTRY IN KANSAS IN 1958, by Walter H. Schoewe, p. 239-287, fig. 1-3, October 15, 1959.
- PART 8. MARINE BANK DEVELOPMENT IN PLATTSBURG LIMESTONE (PENNSYLVANIAN), NEODESHA-FREDONIA AREA, KANSAS, by John W. Harbaugh, p. 289-331, fig. 1-3, pl. 1-13, December 30, 1959.

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- PART 2. KANSAS BUILDING STONE, by Hubert E. Risser, p. 53-122, fig. 1-3, pl. 1-13, September 1, 1960.
- PART 3. LIME RAW MATERIALS IN THE KANSAS CITY AREA, by William Ives and Russell T. Runnels, p. 123-148, fig. 1-2, pl. 1, September 1, 1960.
- PART 4. OCCURRENCE AND BLEACHING PROPERTIES OF SOME KANSAS MONTMORILLONITE CLAYS, by William Ives and Walter E. Hill, Jr., p. 149-188, fig. 1-4, September 15, 1960.
- PART 5. PETROLOGY OF MARINE BANK LIMESTONES OF LANSING GROUP (PENNSYLVANIAN), SOUTHEAST KANSAS, by John W. Harbaugh, p. 189-234, fig. 1-19, pl. 1-8, December 1, 1960.
- PART 6. THE MINERAL INDUSTRY IN KANSAS IN 1959, by Walter H. Schoewe, p. 235-289, fig. 1-8, December 31, 1960.

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