

MINERAL PRODUCTION IN IOWA IN 1926

Products	Unit	Quantity	Value
Cement shipped	Bbl. of 376 lb.	4,788,639	\$ 8,167,341
Clay ware		4,495,088
Coal	Ton	4,625,487	14,214,000
Gypsum	Ton	683,201	6,588,203
Limestone and lime	Ton	944,371	952,141
Sand and gravel	Ton	2,701,982	1,569,006
			\$35,985,779

Mineral production in 1926 continued the decline which has been evident for several years. The decrease from production in 1925 amounted to \$2,407,963 and put the total output lower than that of any year, with one exception, since 1916, when it rose for the first time to the sum of \$30,210,284. The excepted year was 1921, when the value was \$360,609 less than that for 1926. The diminished value in 1926 was chiefly on account of the marked decrease in value of clay wares manufactured although cement, coal and gypsum also failed to reach the levels of the preceding year. Stone and lime and sand and gravel values were somewhat higher in 1926 and the tonnages of stone and lime were considerably above those of 1925 although those of sand and gravel were somewhat less.

The total values of minerals produced in Iowa and in the United States during the past decade are shown in the following table.

Production of minerals from 1917 to 1926

Year	Iowa	United States
1917	\$39,336,372	\$4,992,496,000
1918	38,742,009	5,540,708,000
1919	37,882,183	4,595,770,000
1920	57,250,317	6,981,340,000
1921	35,625,170	4,138,500,000
1922	36,189,398	4,647,290,000
1923	46,237,521	5,986,500,000
1924	40,470,971	5,305,800,000
1925	38,393,742	5,677,630,000
1926	35,985,779	6,262,000,000

Pennsylvania always heads the list of states, on account of its immense production of anthracite and bituminous coal. In 1925 Oklahoma, California, Texas, West Virginia, Ohio and

Illinois were next, in the order given. Iowa had twenty-sixth place in the list. The chief minerals hold rank in the order of coal, petroleum, pig iron, clay products, cement, natural gas, coke, copper, stone, iron ore. It is noteworthy that iron and copper are the only metals to be included among the first ten minerals. Gold is sixteenth and silver eighteenth. Sand and gravel rank thirteenth.

CEMENT

Only four cement plants were active in 1926 as the Gilmore City factory of the Northwestern States Portland Cement Company was not in operation. Production of cement in 1926 exceeded that of 1925 by 277,666 barrels or 6 per cent but shipments were less in 1926 by 68,210 barrels, a decrease of 1 per cent. The value of shipments was \$507,222 less in 1926 than during the previous year. This was in part due to the decline of eight cents per barrel in average factory prices.

Iowa ranks eleventh in amount of production and amount and value of shipments and fifth in average factory price received. The following table gives summarized data for Iowa and the United States.

Production of cement in Iowa and the United States, 1924 to 1926

	1924	1925	1926
	Iowa		
Production, bbls.	5,624,466	4,648,145	4,925,811
Stock, Dec. 31, bbls.	1,695,093	1,479,670	1,616,842
Shipments, bbls.	4,881,613	4,856,849	4,788,639
Shipments, value	\$8,811,587	\$8,674,563	\$8,167,341
Aver. fact. price per bbl.	\$1.81	\$1.79	\$1.71
Consumption, bbls.	3,144,001	2,704,872	2,826,839
Consumption per capita, bbl.	1.26	1.08	1.17
Surplus production, bbls.	1,737,612	2,151,977	2,151,977
Annual capacity, bbls.	6,685,000	6,935,000	6,575,000
Daily clinker capacity, bbls.	20,300	20,603	19,103
Number rotary kilns	28	28	26
	United States		
Production, bbls.	149,358,109	161,685,901	164,530,170
Shipments, bbls.	146,047,549	157,295,212	162,187,090
Shipments, value	\$264,046,708	278,524,108	277,965,473
Average factory price, bbl.	\$1.81	\$1.77	\$1.71
Consumption per capita, bbl.	1.29	1.38	1.37
Number plants active	132	138	140

Pennsylvania has a long lead in the cement industry, as her shipments in 1926 were over 41,000,000 barrels, while California, the next in rank, shipped over 13,600,000. Michigan was third with nearly 12,000,000 barrels to her credit and New York stood fourth with 8,500,000 barrels shipped.

CLAY WARES

The production of clay wares in 1926 fell below that in 1925 in every department except the making of sewer pipe, which gained nearly one hundred thousand dollars in 1926, and the manufacture of pottery, in which an advance of over two thousand dollars was reported. The production of brick of various classes, of hollow building tile and drain tile was notably less than during the preceding year. Indeed the output of drain tile was the lowest it had been since 1901. Coupled with the parallel increase in the making of hollow building ware this is the striking feature of clay manufacture in Iowa. Perhaps a condensed table showing the production of various clay wares will be of interest.

Year	Plants	Common brick	Face brick	Vitrified brick	Hollow ware	Drain tile	Sewer pipe	Other ware	Total value
1894	437	\$1,317,473	\$ 2,950	\$ 376,951	\$ 8,545	\$ 557,312	\$ 58,000	\$ 58,275	\$2,379,506
1895	412	1,095,074	89,430	249,928	19,204	290,515	55,131	76,920	1,870,292
1896	339	1,003,624	47,386	112,985	8,485	225,650	73,039	220,908	1,694,402
1897	330	850,834	60,030	426,056	14,740	372,070	44,300	52,841	1,821,247
1898	349	1,069,947	55,745	290,463	21,013	343,265	33,000	39,050	2,057,022
1899	372	1,328,050	165,590	225,044		359,568		113,946	2,240,217
1900	381	1,462,395	93,632	129,677	22,150	379,140	52,452	246,042	2,395,488
1901	349	1,651,926	87,559	227,378	59,270	516,714	53,500	145,656	2,774,200
1902	329	1,624,673	82,901	212,537	104,324	673,122	76,000	70,034	2,843,591
1903	296	1,396,088	84,506	221,481	131,191	1,009,933	88,000	102,384	3,033,583
1904	331	1,430,581	102,330	199,528	164,658	1,321,745	94,800	173,534	3,507,576
1905	311	1,367,742	63,137	130,003	134,418	1,531,376	90,000	90,994	3,408,547
1906	304	1,125,009	101,795	185,990	162,664	1,721,614	114,241	6,014	3,417,327
1907	277	1,085,383	96,316	223,193	176,854	2,011,793	103,369	30,877	3,728,785
1908	301	896,890	86,232	185,112	129,003	2,522,363	211,044	47,983	4,078,627
1909	241	1,072,340	138,218	198,780	304,398	2,830,910	282,637	89,230	4,916,513
1910	237	1,088,266	109,911	223,273	94,356	3,457,455	313,430	48,335	5,335,036
1911	217	1,025,011	114,178	103,334	374,628	2,463,962	284,817	65,859	4,436,839
1912	207	1,017,097	142,637	197,035	535,254	2,293,084	291,672	47,713	4,524,492
1913	183	1,052,036	181,911	222,105	762,563	2,798,816	503,360	54,790	5,575,581
1914	183	1,067,746	148,394	211,905	1,083,397	3,180,836	558,751	154,966	6,405,995
1915	161	898,851	153,324	300,785	1,008,457	3,802,599	448,721	136,351	6,749,088
1916	162	947,247	283,559	393,038	1,141,291	3,986,163	494,428	129,990	7,375,716
1917	142	1,045,790	282,840	33,310	1,542,884	4,004,989	455,561	80,507	7,543,225
1918	127	749,325	188,041	116,522	1,550,076	2,256,200	398,848	38,660	5,318,848
1919	115	941,489	449,491	179,969	2,475,291	3,127,378	902,008	49,698	8,125,324
1920	109	1,146,182	346,164	176,430	3,048,776	4,760,115	918,669	92,896	10,489,232
1921	103	680,689	189,568		1,209,180	2,412,849	783,429	485,868	5,711,583
1922	69	728,508	354,041		2,170,368	1,495,116	681,233	310,183	5,739,449
1923	64	921,853	593,791	513,684	2,392,521	1,508,836	865,676	237,563	7,033,924
1924	69	737,898	451,136	129,314	2,186,542	1,266,586	793,840	154,379	5,719,694
1925	67	855,305	536,545	184,939	2,118,261	925,958	929,294	175,937	5,726,239
1926	53	652,025	511,772		1,539,257	482,794	1,024,763	284,477	4,495,088

One of the notable features shown by this table is the great decrease in number of plants in operation. There are several possible causes for this mortality, among them being exhaustion or unsuitability of available material, the tendency to concentrate production into fewer and larger plants, the lack of markets as farm drainage became more complete and as the local markets supplied by these numerous smaller operations were invaded by wares, both cheaper and better, perhaps, produced by larger plants. Of course general financial conditions have also been an important factor.

Naturally unit prices have risen markedly and are as important as total production in accounting for the increased values above earlier years. The following short table will give a general idea of these two factors.

Quantities and prices of clay wares

	1897		1905		1915	
	Quan.	Price	Quan.	Price	Quan.	Price
Common brick, M	140,032	\$ 4.80	170,067	\$ 8.03	125,752	\$ 7.15
Face brick, M	10,669	6.10	5,937	10.63	11,916	12.87
Vitrified brick, M	56,315	7.14	12,963	10.03	20,573	14.62
	1920		1923		1926	
Common brick, M	60,470	\$ 18.95	72,558	\$ 12.71	57,381	\$ 11.36
Face brick, M	13,678	25.31	29,346	20.11	30,963	16.50
Vitrified brick, M	6,116	28.85	6,500	19.00	7,600	20.00
Hollow ware, tons	293,081	10.40	323,326	7.40	260,194	5.91
Drain tile, tons	453,122	10.51	173,678	8.69	74,445	6.62
Sewer pipe, tons	41,634	22.07	54,828	15.79	71,883	14.26

Figures are not available for quantities of hollow ware, drain tile or sewer pipe previous to 1919. The figures for vitrified brick in 1923 and 1926 are only approximate.

The table which follows shows as fully as is possible the production of different wares in 1926. The decrease in the number of operators in different counties makes the showing of county productions impossible in most cases. Thus fifty-three operators from thirty-two counties reported production in 1926 and Dallas, Polk and Webster were the only counties in which three or more plants were working. In 1897, by contrast, 330 operators reported from 81 counties. Data from fifty counties could be given in detail. The figures for 1926 show that forty-one plants made common brick, twenty-four made face brick, thirty-six made hollow building tile, thirty-four made drain tile, five made sewer pipe, five flue lining and four wall coping.

Production of Clay Wares in Iowa in 1926

Counties	No. Pro- ducers	Common brick, face brick, vitrified brick		Hollow ware		Drain tile		Other products (a)	Total value
		Thous.	Value	Tons	Value	Tons	Value	Value	
Appanoose(1), Henry(1), Lee(1), Washington(1)	4	3,120	\$ 34,643	4,130	\$ 24,590	b			\$ 59,233
Audubon(2), Pottawattamie(1), Union(1)	4	1,667	17,572	1,961	12,430	3,880	\$ 25,684		55,686
Benton(1), Grundy(1), Hardin(1), Tama(2)	5	3,428	47,095			731	5,915	(9)c	53,010
Cerro Gordo(1), Dubuque(1), Fayette(1), Floyd(1), Wright(1)....	5	9,708	129,717	109,823	609,335	32,461	174,731		913,783
Dallas(3), Guthrie(1)	4	2,852	37,609	33,364	194,566	8,341	52,979		285,154
Jackson(1), Johnson(1), Jones(1), Scott(1)	4	342	5,208	1,077	4,712	d		\$28,367(8)	38,287
Jasper(2), Keokuk(1), Poweshiek(2)	5	d		1,302	10,153	1,997	18,071	230,182(5)(6)(7)(8)	258,406
Mahaska(2), Wapello(1)	3	7,911	88,828	18,034	113,048	5,152	30,862		232,738
Polk(5), Warren(1)	6	29,281	467,090	29,450	172,122	6,805	59,974	209,795	908,981
Story(2), Woodbury(2)	4	29,070	367,118	5,325	39,763	b			406,881
Webster	8	8,409	115,722	57,503	373,628	12,687	95,105	698,474(5)(6)(7)(9)	1,282,929
	53	95,942	1,314,244	260,194	1,539,257	74,445	482,794	1,158,793	4,495,088

(a) Includes: (5) Sewer pipe, 71,883 tons, value \$1,024,763; (6) Flue lining and (7) wall coping, 5,732 tons, value \$66,193; (8) Other ware and pottery and (9) raw clay sold, value \$67,805.

(b) Included with Hollow ware; (c) Included with Drain tile; (d) Included with Other products.

The following summary table gives data of production for the nation in 1926.

Class	No Est.	Quantity	Value
Common brick, M	1,220	7,520,411	\$ 88,249,925
Vitrified brick, for paving, M	80	381,684	8,918,947
other uses, M	51	85,896	1,365,794
Face brick, M.....	456	2,439,820	44,516,236
Fancy and enameled brick, M	9	15,556	1,279,284
Hollow brick, M	39	63,359	692,258
Terra cotta, tons	34	155,564	19,666,880
Hollow bld. tile, partition, etc., tons	396	3,698,778	23,560,571
Hollow Bld. tile, floor arch, etc. tons.	66	397,639	4,257,857
Roofing tile, squares	44	408,724	7,015,775
Floor tile, sq. ft.	65	24,920,354	5,521,965
Mosaic tile, sq. ft.	19	22,573,178	4,865,967
Faience tile, sq. ft.	33	7,702,558	4,794,128
Wall tile, sq. ft.	26	39,009,986	12,787,359
Drain tile, tons	301	519,483	3,858,408
Sewer pipe, tons	111	1,994,333	29,303,094
Stove lining, tons	20	11,573	472,904
Flue lining, tons	89	241,465	2,857,309
Wall coping, tons	54	56,345	685,303
Fire brick, M	230	1,048,694	42,706,932
Clay, tons	292	107,836	3,995,059
Other ware	94		6,581,590
	2,008		\$317,953,545
Pottery	351		116,488,308
Totals.....	2,359		434,441,853

COAL

A study of the data on coal production in 1926 and comparison with similar data for previous years brings out several interesting facts. While the list of producing counties remains about the same there are some important shifts in relative rank. In 1916 three counties mined over a million tons each, namely, in order, Monroe, Polk and Appanoose, and in fact Monroe county usually has been the leader. In 1926 the three leaders were Marion, Monroe and Polk, although neither county reached the million ton mark. Marion has attained the supremacy in recent years through the output of three large mines—the Consolidated Indiana, Pershing and Red Rock. Appanoose, on the other hand, produced less than half as much coal in 1926 as in 1916. Another noteworthy fact is that Appanoose county mines always require more men per ton of coal raised than any of the other large producers. Probably this is due to the combination of

low coal and numerous small mines—fifty-seven in 1926—which renders large output per man difficult or impossible. It would be an interesting study to determine the number of tons of coal produced per man in different fields and under different working conditions. It may be stated here that the output per man in Appanoose in 1926 was 233 tons and in Marion, with fourteen mines, the output was 778 tons per man. Adams county miners recovered only 141 tons per man.

It may be noted again that while the number of men employed in mining increased up to 1909, when 17,286 were engaged, the number has declined since then until in 1926 only 8,869 men were reported. In comparing figures for 1925 and 1926 it may be noted that while the production in 1926 was only 89,356 tons less than in 1925, yet 1,298 fewer men were required to produce the tonnage of the later year and that on the average the men worked thirty days more than in 1925.

The small field in the Nodaway bed in Adams, Page and Taylor counties continues operation on about the same small but steady scale and it is noteworthy that its average value and average days worked are among the highest in the state.

As a rule the larger mines and more important counties are well served by railroads. Every mine in Monroe county except one has railroad connections and thirty-nine Appanoose mines are served by railroads. However, only six Polk county mines are on railways, Wapello has only one railroad mine and Mahaska has none.

The number of operators decreased from 193 in 1925 to 184 in 1926 while the number of active mines dropped from 208 to 193. The table given below shows the data regarding production in the different counties and for the sake of comparison gives totals for 1925.

Coal production in Iowa in 1926

Counties	No. Pro-ducers	Loaded at mines for ship-ment	Sold to local trade	Used at mines	Total production		Average value per ton at mine	Number of employees			Average number of days worked
		tons	tons	tons	tons	value		Under-ground	Surface	Total	
Adams	4		6,088		6,088	\$ 23,000	\$3.78	41	2	43	125 (a)
Appanoose	52	425,708	52,653	2,136	480,497	1,592,000	3.31	1925	144	2,069	114
Boone	6	354,434	65,882	7,066	427,382	1,402,000	3.28	751	51	802	219
Dallas	5	348,023	9,972	1,416	359,411	1,064,000	2.96	676	62	738	148
Davis(1), Lucas(2)	3	411,246	5,009	18,596	434,851	1,307,000	3.53, 3.00	505	51	556	149, 249
Greene(2), Story(1)	3		4,899		4,899	12,400	2.44, 2.51	17	4	21	129, 40
Guthrie	4		5,591		5,591	15,000	2.68	26	1	27	125
Jasper	6	(b)	21,344	2,750	24,094	94,000	3.90	67	14	81	132
Jefferson(2), Keokuk(2)	4		2,369		2,369	7,000	2.89, 3.05	16	3	19	81, 65
Mahaska	24		55,133	(b)	55,133	147,000	2.67	118	9	127	161
Marion	14	878,474	33,120	14,494	926,088	2,588,000	2.79	1,104	86	1,190	238
Monroe	11	826,000	24,226	24,746	874,972	2,690,000	3.07	1,231	100	1,331	210
Page(2), Webster(1)	3	(b)	25,258		25,258	96,000	4.11, 2.50	58	7	65	225, 180
Polk	17	318,722	345,184	10,549	674,455	2,163,000	3.21	1,102	88	1,190	190
Taylor	4	(b)	13,424	(b)	13,424	58,000	4.32	48	4	52	208
Van Buren	3	(b)	6,643	(b)	6,643	18,000	2.71	16	2	18	145
Wapello	14	(c)	50,743	1,765	52,508	153,000	2.92	115	8	123	161
Warren	3	214,104	9,381	9,134	232,619	725,000	3.12	313	33	346	223
Wayne	4		19,205	(b)	19,205	60,000	3.13	63	8	71	134
Totals.....	184	3,791,893	740,136	93,458	4,625,487	14,214,000	3.07	8,192	677	8,869	183
Totals for 1925	193	3,711,654	905,840	97,349	4,714,843	\$14,807,000		9,337	830	10,167	153

(a) Low figure due to short operation of one mine. (b) Included with Sold to local trade. (c) Included with Used at mines.

COAL PRODUCTION IN 1926

GYPSUM

The gypsum industry was unable to live up to its record for several years of increasing output each year. The quantity mined in 1926 was 1,743 tons larger than that mined in 1925 and the amounts of neat plaster and wall board were larger also, but several other items were somewhat smaller, so that the total value of the output was \$146,068 less than the value of the product for 1925. The amount of raw gypsum used in agriculture does not increase much although it fluctuates a good deal. The value of gypsum as a soil amendment has been fairly well demonstrated and probably its cost and the lack of knowledge as to its qualities are the only deterrents to wider use. The Iowa Geological Survey has issued a pamphlet entitled Gypsum in Agriculture and the Iowa Agricultural Experiment Station's Bulletin 232 gives results of tests on uses of gypsum on various soils.

The following table gives the output of different products in 1925 and 1926.

Gypsum production in 1925 and 1926

	1925		1926	
	tons	value	tons	value
Crude gypsum mined	800,167		802,910	
Sold crude—to cement mills	134,200	\$ 330,000	125,956	\$ 268,507
for agriculture and other uses	6,251	51,585	3,847	28,347
Total sold crude	140,451	381,585	129,803	296,854
Sold calcined—as stucco	21,329	137,903	30,355	236,804
as neat plaster	380,124	2,918,414	402,005	3,005,877
as sanded plaster	25,837	185,313	164	1,751
as plaster of paris	3,192	37,503	2,455	23,266
as dental plaster	4,031	33,221	1,823	17,781
as wall or plaster board	71,754	2,332,141	87,395	2,605,745
as partition tile	50,835	529,581	18,481	171,621
for insulating, fire-proofing, other uses	5,108	178,611	10,820	223,504
Total sold calcined	562,210	6,352,687	553,498	6,291,349
Total sold	702,661	6,734,271	683,201	6,588,203

The list of producers remained the same as in 1925 except that the Centerville Gypsum Company was reorganized as the Federal Gypsum Company with headquarters at Des Moines. This company increased its sales of anhydrite for poultry grits very notably over those for 1925. The Hawkeye Gypsum Products Company marketed its entire output to the cement trade for retarder. The table given above shows that three items

account for much the greater part of the amount and value of gypsum products sold, namely raw gypsum for cement retarder and calcined gypsum used as neat plaster and as wall and plaster board. These amount to 619,203 tons, valued at \$5,908,476 out of total sales of 683,201 tons with a value of \$6,588,203.

LIMESTONE AND LIME

The production of limestone and lime in 1926 was one of the bright spots in the mineral industry in Iowa and one of the few in which marked gains were made over production in 1925. In fact the output of limestone was next to the largest recorded in the history of the industry. The peak of production was reached in 1912 when the limestone produced was valued at \$944,885 and the sandstone and lime marketed were worth \$53,351, which was somewhat more than the value of the lime burned in 1926. Hence the total output of stone and lime in 1912 was valued at \$998,236 or \$46,095 more than the value of the 1926 production. As compared with conditions in 1925 the industry shows a gain of 136,083 tons, and \$47,472. Substantial increases were made in amounts and values of lime burned, of rough stone used for rubble and for riprapping and of crushed stone used as railroad ballast, flux, sugar clarifier and notably as agricultural stone, which reached the highest production in the history of its use in Iowa. As is natural in these days of road building and concrete construction the production of crushed rock for these purposes occupied much the largest part of the attention of quarrymen and the output was larger by 79,616 tons than that of 1925. However, owing to somewhat lower prices the total value was \$75,413 less than that of the product during 1925. For the first time in many years no production of building stone was reported. Mr. Wilkes Williams of Postville, who conducted the one establishment in Iowa for dressing native limestone, has recently died and hence it is probable that this industry will not be revived. Sixteen counties reported production in 1926 as against fifteen in 1925. The Iowa Limestone Company of Des Moines has recently taken over the Alden quarries in Hardin county and is already becoming an important factor in the production of crushed stone for various uses.

The table given below will explain the statements made above and will show the details of production by counties so far as possible.

Production of Limestone and Lime in 1926

Counties	Pro- ducers	Rubble, riprap ^a		Concrete, road metal		Other uses ^b		Total	
		tons	value	tons	value	tons	value	tons	value
Black Hawk(2), Cerro Gordo(1)	3			58,498	\$ 67,871	9,802	\$ 6,446	68,200	\$ 74,297
Clayton(1), Clinton(1), Marshall(1), Winneshiek(1)	4	50,270	\$42,270	52,755	55,004	77,784	78,057	190,809	175,531
Dubuque	5	27,241	27,859	54,121	72,003	4,635	43,911	85,997	143,770
Hardin(1), Jackson(1), Johnson(1)	3			115,092	132,700	49,353	55,207	164,445	187,907
Jones	3	9,305	9,640	12,202	11,462	4,174	3,110	25,681	24,212
Lee	3	c		27,883	38,352	14,400	21,216	42,283	59,568
Linn(1), Lousia(1), Mitchell(1)	3			c		14,483	21,229	14,483	21,229
Scott	3	6,670	7,789	201,070	214,347	44,640	43,691	368,580	265,827
Totals.....	27	97,300	94,917	627,290	599,490	219,781	257,734	944,371	952,141
Totals for 1925	27	57,923	68,176	547,674	674,903	152,692	161,590	808,288	904,669

^a Includes: Rubble, 5 producers, 6,150 tons, value \$7,161; Riprap, 10 producers, 91,150 tons, value \$87,756.

^b Includes: Railroad ballast, 3 producers, 75,190 tons, value \$69,670; Flux, 5 producers, 14,280 tons, value \$17,677; Sugar factories and lime, 5 producers, 15,711 tons, value \$68,767; Agriculture, 16 producers, 114,700 tons, value \$101,620.

^c Included in Other uses.

SAND AND GRAVEL

The total quantity of sand and gravel produced in 1926 was considerably less than the output of the previous year, but as prices averaged somewhat better the combined values were a little higher in the later year. Individual grades differed both in amounts and in values. For the first time, figures of washed material were collected and these show that a large share of the production goes through some process of preparation for use. The following summary shows the kinds and amounts of material produced in 1925 and 1926 and will permit comparison of outputs.

Summary of sand and gravel production

Kind of material	1925			1926		
	No. pits	tons	value	No. pits	tons	value
<i>Sand</i>						
Molding	4	33,418	\$ 36,134	5	27,843	\$ 23,259
Structural	58	636,534	321,190	50	664,062	354,341
Paving	27	882,368	245,900	30	524,761	235,285
Cutting and grinding	5	19,324	28,223	3	13,688 ^b	14,555
Engine	13	40,350	24,715	11	43,091	30,225
Filter	6	6,249	7,127	4	10,773	2,882
R.R. ballast				5	47,438	16,616
Other	10	51,255 ^a	24,970	7	17,551 ^c	8,988
Total sand.....		1,669,498	688,259		1,349,207	686,151
<i>Gravel</i>						
Structural	47	381,496	342,653	39	307,610	282,125
Paving	38	939,102	426,781	34	661,782	430,777
R.R. ballast	8	307,689	89,207	13	377,472	162,983
Other				4	5,911	6,970
Total gravel.....		1,628,287	858,641		1,352,775	882,855
Total production		3,297,785	1,546,900		2,701,982	1,569,006

^a Includes Ballast sand and Fire or furnace sand.

^b Includes Blast sand.

^c Includes Fire or furnace sand.

An attempt has been made this year to show the production of gravel in a little more detail than formerly and in the table by counties the output of different kinds is shown so far as possible. Structural sand includes that used in concrete and mortar and structural gravel is used in concrete for building. That used in paving and roadmaking is included in the column headed Paving and other gravel. The table shows also that Polk county maintained rather a long lead in production of both sand and gravel, Muscatine was second and Cherokee had third place. Mahaska, Marion and Wapello are worthy of note for such large

production from southern Iowa, where sand and gravel are relatively scarce. It is unfortunate that so few counties have three or more producers—from the standpoint of the statistician as well as that of producers and consumers, because the small number prohibits revelation of data regarding most counties. In 1926 eighty-five producers were distributed over forty-two counties and only six counties had three or more operators.

Production of sand in the United States in 1926 amounted to 92,114,279 tons, valued at \$55,675,988, while gravel production was 90,986,539 tons, valued at \$55,662,713, making a total production of 183,100,818 tons, with a value of \$111,338,701. The Bureau of Mines estimates that this material represents the volume of a ditch a yard wide and a yard deep extending three times around the world.

New York ranked first with a production of 19,334,000 tons, Illinois was second with 17,777,000 tons and Iowa ranked eighteenth.

Production of sand and gravel in 1926

Counties	Pro-ducers	Structural sand		Paving and other sands		Total sand	
		tons	value	tons	value	tons	value
Black Hawk(1), Butler(2)	3	28,301	\$ 13,918	b		28,301	\$ 13,918
Boone(1), Marshall(2), Story(1)	4	21,640	10,912	19,664	\$ 8,765	41,304	19,677
Buena Vista(0), Clay(1), Dickinson(1), Lyon(1), Osceola(1)	4	9,705	3,095	9,047	678	18,752	3,773
Cerro Gordo(1), Floyd(1), Franklin(1), Wright(0)	3	84,568	34,000	b		84,568	34,000
Cherokee(3), Plymouth(2)	5	72,560	21,036	b		72,560	21,036
Clayton(2), Dubuque(2), Fayette(1), Winneshiek(1) ..	6	13,458	8,075	62,296	26,732	75,754	34,807
Clinton(2), Jackson(2)	4	5,586	4,102	18,389	11,759	23,975	15,861
Dallas(0), Des Moines(2), Lee(2), Scott(2)	6	43,761	30,631	46,018	33,584	89,779	64,215
Hardin(2), Humboldt(1), Kossuth(0), Palo Alto(1)	4	23,341	17,317	b		23,341	17,317
Ida(1), Sac(1), Webster(1)	3	21,409	10,570	b		21,409	10,570
Johnson(2), Tama(1)	3	38,050	17,500	b		38,050	17,500
Linn	3	89,917	64,783	43,609	23,830	133,526	88,613
Mahaska(1), Marion(1), Wapello(1)	3	179,199	100,757	b		179,199	100,757
Muscatine	5	38,131	34,720	116,536	59,241	154,667	93,961
Polk	9	152,535	55,062	132,919	54,807	285,454	109,869
Sioux	5	79,535	45,885	24,591	10,102	104,126	55,987
Totals	70	664,062	354,341	685,145	331,810	1,349,207	686,151
Totals for 1925		632,695	318,587	1,023,231	360,859	1,669,498	688,259

a Includes: Molding, paving and roadmaking, cutting and grinding, blast, fire or furnace, engine, filter, railroad ballast, and other sands.
 b Included with structural sand.

MINERAL PRODUCTION IN 1926

Production of sand and gravel in 1926

Counties	Pro- ducers	Structural gravel		Paving and other gravele		Total sand and gravel		Total quantity washed	
		tons	value	tons	value	tons	value	tons	value
Black Hawk(2), Butler(1)	3	26,228	\$ 21,559			54,529	\$ 35,477	53,219	\$ 34,947
Boone(1), Marshall(2), Story(2)	5	6,447	8,642	95,306	\$ 11,000	137,051	37,219	47,751	28,319
Buena Vista(1), Clay(1), Dickinson(1), Lyon(2) Osceola(1)	6	7,992	3,256	15,779	2,175	42,603	9,204	14,009	2,821
Cerro Gordo(1), Floyd(0), Franklin(0), Wright(2)	3	<i>a</i>		84,352	83,787	168,918	117,787		
Cherokee(3), Plymouth(2)	5	31,934	20,543	187,942	77,860	292,436	118,439	141,861	65,681
Clayton(0), Dubuque(2), Fayette(1), Winneshiek(0) ..	3	<i>a</i>		30,550	19,338	106,304	54,145	85,230	45,911
Clinton(3), Jackson(2)	5	19,537	15,225	62,890	44,908	106,402	75,994	106,402	75,994
Dallas(1), Des Moines(2), Lee(0), Scott(0)	3	<i>a</i>		36,156	34,637	126,035	98,852	102,745	76,175
Hardin(1), Humboldt(1), Kossuth(1), Palo Alto(1)	4	27,253	17,228	76,366	15,732	126,959	50,277	61,378	40,677
Ida(0), Sac(2), Webster(2)	4	31,623	29,643	106,208	23,150	159,240	63,363	156,663	62,700
Johnson(2), Tama(1)	3	<i>a</i>		6,100	4,600	44,150	22,100		
Linn	2	<i>b</i>				132,833	88,613	132,747	88,599
Mahaska(1), Marion(1), Wapello(1)	3	<i>b</i>		59,019	74,566	238,218	175,323	237,935	174,746
Muscatine	4	21,882	19,600	109,159	100,230	285,708	213,801	285,708	213,801
Polk	7	58,146	74,589	197,583	145,053	541,183	329,475	538,197	323,999
Sioux	3	35,386	22,950	<i>e</i>		139,512	78,937	133,135	76,825
Totals	63	307,610	282,125	1,045,165	600,730	2,701,982	1,569,006	2,294,289	1,444,995
Totals for 1925		381,496	342,653	1,246,791	515,988	3,297,785	1,546,900		

b Included with structural sand.

c Includes: Paving and roadmaking, railroad ballast, and other gravel.

d Included with paving gravel.

e Included with structural gravel.