
**Mineral Production in Iowa in
1927**

by

JAMES H. LEES

MINERAL PRODUCTION IN 1927*

While the total valuation of the mineral output of 1927 was somewhat less than that of the preceding two years, yet in each branch but one there was an increase—in most cases a strongly marked one. The lone exception was the coal industry, in which the biennial strike caused a serious decline in output. It is evident that unless this industry can settle its differences in less mutually disastrous fashion it is doomed to eclipse by the eastern states, which have the edge on Iowa both in methods of mining and labor scales and in quality of output. The Geological Survey and the State University are making an effort to devise or adapt better methods of using Iowa coals in order to increase their output and use and to make such use more pleasant and economical. A start in this work has been made by the analysis of thirty-six typical coal samples from as many mines in the state. Further work will be done in the way of efforts to coke Iowa coal and to improve its quality by washing and in other ways.

The Iowa Railroad Commission furnishes the following data on shipments of mineral commodities originating in this state. Figures are for carloads.

| | |
|------------------------------------|--------|
| Coal | 26,083 |
| Clay, gravel, sand and stone | 71,584 |
| Cement | 28,764 |
| Brick and artificial stone | 14,561 |
| Lime and plaster | 6,987 |
| Sewer pipe and drain tile | 11,583 |

While some of these figures include reshipments of materials really produced outside the state, most of them represent materials actually extracted or made within the state's limits.

* Figures are compiled from data furnished by the U. S. Bureau of Mines and Bureau of the Census cooperating with the Iowa Geological Survey.

Mineral Production in Iowa, 1925 to 1927

| Product | Unit | 1925 | | 1926 | | 1927 | |
|-----------------------|-----------------|-----------|--------------|-----------|--------------|-----------|--------------|
| | | quantity | value | quantity | value | quantity | value |
| Cement shipped | Bbl. of 376 lb. | 4,856,849 | \$ 8,674,563 | 4,788,639 | \$ 8,167,341 | 5,661,234 | \$ 9,124,405 |
| Clay wares | | | 5,726,239 | | 4,495,088 | | 5,194,780 |
| Coal | ton | 4,714,843 | 14,807,000 | 4,625,487 | 14,214,000 | 2,949,622 | 9,304,000 |
| Gypsum | ton | 702,661 | 6,734,271 | 683,201 | 6,588,203 | 723,942 | 6,713,497 |
| Limestone and lime | ton | 808,288 | 904,669 | 944,371 | 952,141 | 1,278,056 | 1,267,033 |
| Sand and gravel | ton | 3,297,785 | 1,546,900 | 2,701,982 | 1,569,006 | 3,981,143 | 1,839,176 |
| | | | \$38,393,742 | | 35,985,779 | | \$33,442,891 |

CEMENT

Manufacture of Portland cement in Iowa was 10 per cent greater in 1927 than in 1926 and shipments increased 18 per cent in the later year. The Dewey Portland Cement Co. put its Davenport plant into operation in 1927. It has two 11 by 175 foot kilns and a daily clinker capacity of 3000 barrels or an annual finished cement capacity of 1,000,000 barrels. This increased the number of factories in the state to six, although the plant at Gilmore was not operated. The data regarding the industry in recent years are given herewith.

Production of Cement in Iowa and the United States

| | 1925 | 1926 | 1927 |
|--------------------------------|-------------|-------------|-------------|
| Iowa | | | |
| Production, bbls. | 4,648,145 | 4,925,811 | 5,415,144 |
| Stock, Dec. 31, bbls. | 1,479,670 | 1,616,842 | 1,370,752 |
| Shipments, bbls. | 4,856,849 | 4,788,639 | 5,661,234 |
| Shipments, value | \$8,674,563 | 8,167,341 | 9,124,405 |
| Aver. fact. price per bbl. | \$1.79 | \$1.71 | \$1.61 |
| Consumption, bbls. | 2,704,872 | 2,826,839 | 3,708,471 |
| Consumption per capita, bbls. | 1.08 | 1.17 | 1.53 |
| Surplus production, bbls. | 2,151,977 | 1,961,800 | 1,952,763 |
| Annual capacity, bbls. | 6,935,000 | 6,575,000 | 7,935,000 |
| Coal used per bbl. cement, lb. | | | 178 |
| Coal used annually, tons | | | 474,297 |
| United States | | | |
| Production, bbls. | 161,685,901 | 164,530,170 | 173,206,513 |
| Shipments, bbls. | 157,295,212 | 162,187,090 | 171,864,728 |
| Shipments, value | 278,524,108 | 277,965,473 | 278,854,647 |
| Average factory price, bbl. | \$1.77 | \$1.71 | \$1.62 |
| Consumption per capita, bbl. | 1.38 | 1.37 | 1.44 |
| Number plants active | 138 | 140 | 153 |
| Annual capacity, bbls. | 193,558,000 | 215,300,000 | 227,080,000 |

CLAY WARES

The production of clay wares was somewhat in excess of that for 1926, although it was still below the output of the preceding years as far back as 1913. The manufacture of brick and sewer pipe was less in 1927 than in 1926, but other branches of the industry showed an increase. The tables show that 41 plants in 25 counties made brick of various kinds, that 28 plants in 19 counties made hollow building tile and that 40 plants in 24 counties made drain tile. Only four plants, in Keokuk, Polk and Webster counties, made sewer pipe, and other wares were produced in 13

Production of Clay Wares in Iowa in 1927

| Counties | No. Pro- ducers | Brick(a) | | Hollow ware(b) | | Drain tile, sewer pipe, other products (c) | | Total value |
|--|--------------------|----------|-----------|----------------|-----------|---|-------------|----------------|
| | | Thous. | Value | Tons | Value | Tons | Value | |
| Appanoose (1), Henry (1), Jefferson (1), Lee (1), Van Buren (1) | 5 | 1,960 | \$24,553 | 1,396 | \$ 7,205 | 3,743 | \$27,270 | \$59,028 |
| Audubon (2), Pottawattamie (1), Union (1), Woodbury (2) | 6 | 19,740 | 227,819 | 5,929 | 38,018 | 3,729 | 25,409 | 291,246 |
| Benton (1), Grundy (1), Hardin (1), Tama (2) | 5 | 1,398 | 23,792 | (d) | | 1,195 | 13,112 | 36,904 |
| Cerro Gordo | 3 | 4,303 | 49,637 | 141,105 | 730,640 | 77,798 | 435,590 | 1,215,496 |
| Dallas | 3 | 3,384 | 42,142 | 35,460 | 211,411 | 16,249 | 104,081 | 357,633 |
| Dubuque (1), Jackson (1), Johnson (1), Jones (1), Washington (1) | 5 | 1,528 | 22,350 | (e) | | 1,592 | 33,903 | 56,253 |
| Fayette (1), Floyd (1), Franklin (1), Wright (1) | 4 | 5,793 | 75,177 | 28,405 | 251,837 | 21,415 | 186,477 | 513,491 |
| Jasper (1), Poweshiek (1), Story (2), Warren (1) | 5 | 205 | 2,534 | 12,384 | 72,854 | 5,551 | 38,566 | 113,954 |
| Keokuk | 3 | (d) | | | | 22,943 | 278,667 | 278,667 |
| Mahaska (3), Wapello (1) | 4 | 10,395 | 115,956 | 17,584 | 111,520 | 9,560 | 69,474 | 296,950 |
| Polk | 5 | 26,862 | 438,326 | 28,626 | 255,438 | (f) | | 693,764 |
| Webster | 7 | 14,455 | 195,811 | 33,775 | 232,322 | 64,022 | (g) 763,684 | 1,262,570 |
| Total for 1927 | 55 | 90,053 | 1,219,695 | 293,061 | 1,766,653 | 251,000 | 2,208,432 | 5,194,780 |
| Total for 1926 | 53 | 95,942 | 1,314,244 | 260,194 | 1,539,257 | | 1,641,587 | 4,495,088 |

(a) Includes: Common brick, 51,885,000, value \$564,425; Face brick, 23,720,000, value \$397,945; Hollow brick, 394,000, value \$4,742; Paving and other vitrified brick, 14,054,000, value \$252,583.

(b) Includes: Partition, load-bearing, etc., 232,575 tons, value \$1,363,354; Floor, arch, silo, etc., 60,486 tons, value \$403,299.

(c) Includes: Drain tile, 176,404 tons, value \$1,167,542; Sewer pipe, 65,322 tons, value \$913,676; Flue lining, 3,925 tons, value \$46,778; Wall coping, 972 tons, value \$17,924; Segment blocks, pottery, other products, value \$25,996; Raw clay, value \$16,516.

(d) Included in Drain tile.

(e) Included in Brick.

(f) Included in Hollow ware.

(g) Includes other products, value \$70,753.

plants in eight counties. Jackson had the only plant making earthenware in 1927—the Bellevue pottery.

The following table shows the production of the various items of the clay industry. Most counties are grouped by geographic proximity, where it is needful to conceal output of individual plants.

COAL

The year 1927 was not a very prosperous one for the coal industry, because of the disastrous strike which kept most of the mines closed during many months of the year. For this reason the output was the smallest since 1881, when it was 1,960,000 tons.

The following figures are of interest to show the classification of the coal that was loaded at mines for shipment in 1927. The total shipments of 2,147,000 tons were divided into: run-of-mine, 839,000, or 42.5 per cent of the amounts specified; prepared sizes, 816,000, or 41.3 per cent; slack or screenings, 321,000, or 16.2 per cent; not specified, 171,000.

Tons of coal and percentages mined by different methods were as follows: hand, 247,751, 8.4 per cent; shot off solid, 1,752,197, 59.4 per cent; machine cut, 867,885, 29.4 per cent; not specified, 81,789, 2.8 per cent.

The total production in Iowa from the earliest recorded output is 271,861,000 tons. The total for the United States is 14,428,639,000 tons bituminous and 3,642,992,000 Pennsylvania anthracite.

The table given below includes the essential data concerning the coal mining industry in 1927 and the totals for 1926.

Bituminous coal production in the United States was the lowest for five years, with the exception of 1924. It amounted to 517,763,000 tons, valued at the mines at \$1,029,657,000, an average of \$1.99. The active commercial mines numbered 7,011. Average number of days worked was 191; average number of employees was 593,918; average output per man—daily 4.55 tons, annual 872 tons. Iowa ranked seventeenth in tonnage and fifteenth in value of output.

Production, Value, Men Employed, Days Worked, and Output Per Man Per Day at Coal Mines in Iowa, in 1927^a
(Exclusive of product of wagon mines producing less than 1,000 tons)

456

| County | No. Producers | Net tons | | | | Value | | Number of employees | | | Average number of days worked | Average tons per man per day |
|---------------------------------|---------------|-----------------------------|---|----------------------------------|----------------|------------|-----------------|---------------------|---------|-------|-------------------------------|------------------------------|
| | | Loaded at mine for shipment | Sold to local trade and used by employees | Used at mines for steam and heat | Total quantity | Total | Average per ton | Underground | Surface | Total | | |
| Adams | 3 | ----- | 3,860 | ----- | 3,860 | \$ 14,000 | \$3.63 | 16 | 2 | 18 | 206 | 1.04 |
| Appanoose | 49 | 259,716 | 55,830 | 1,067 | 316,613 | 1,008,000 | 3.18 | 1,920 | 143 | 2,063 | 69 | 2.21 |
| Boone | 8 | 216,413 | 62,752 | 4,426 | 283,591 | 1,247,000 | 4.40 | 849 | 58 | 907 | 135 | 2.31 |
| Dallas | 5 | 259,618 | 15,368 | 1,649 | 276,635 | 841,000 | 3.04 | 594 | 49 | 643 | 127 | 3.38 |
| Davis, Jefferson, and Keokuk | 3 | ----- | 6,183 | ----- | 6,183 | 23,000 | 3.72 | 17 | 2 | 19 | 138 | 2.36 |
| Greene, Story, and Webster | 3 | ----- | 13,186 | ----- | 13,186 | 45,000 | 3.41 | 32 | 5 | 37 | 184 | 1.94 |
| Guthrie | 4 | ----- | 7,534 | ----- | 7,534 | 31,000 | 4.11 | 22 | 4 | 26 | 192 | 1.51 |
| Jasper | 7 | 4,600 | 42,301 | 2,010 | 48,911 | 140,000 | 2.86 | 94 | 15 | 109 | 142 | 3.16 |
| Mahaska | 25 | 725 | 42,900 | 492 | 44,117 | 112,000 | 2.54 | 125 | 10 | 135 | 138 | 2.37 |
| Marion | 12 | 431,062 | 35,387 | 8,779 | 475,228 | 1,294,000 | 2.72 | 923 | 78 | 1,001 | 122 | 3.88 |
| Monroe | 11 | 411,291 | 23,108 | 10,574 | 444,973 | 1,327,000 | 2.98 | 1,285 | 93 | 1,378 | 102 | 3.18 |
| Polk | 15 | 257,040 | 326,906 | 10,609 | 594,555 | 1,851,000 | 3.11 | 1,105 | 94 | 1,199 | 158 | 3.14 |
| Taylor | 3 | 10,650 | 6,662 | ----- | 17,312 | 75,000 | 4.33 | 51 | 4 | 55 | 198 | 1.59 |
| Van Buren | 3 | 7,458 | 3,445 | 120 | 11,023 | 25,000 | 2.27 | 20 | 2 | 22 | 214 | 2.34 |
| Wapello | 14 | 1,193 | 54,262 | 370 | 55,825 | 174,000 | 3.12 | 119 | 13 | 132 | 169 | 2.51 |
| Warren | 3 | 112,229 | 5,828 | 8,950 | 127,007 | 396,000 | 3.12 | 354 | 32 | 386 | 99 | 3.32 |
| Wayne | 4 | 800 | 19,985 | 225 | 21,010 | 72,000 | 3.43 | 74 | 8 | 82 | 131 | 1.96 |
| Other counties (Lucas and Page) | 4 | 173,993 | 21,258 | 6,808 | 202,059 | 629,000 | 3.11 | 485 | 44 | 529 | 112 | 3.41 |
| | 176 | 2,146,788 | 746,755 | 56,079 | 2,949,622 | 9,304,000 | 3.15 | 8,085 | 656 | 8,741 | 114 | 2.96 |
| Totals for 1926 | 184 | 3,791,893 | 740,136 | 93,458 | 4,625,487 | 14,214,000 | 3.07 | 8,192 | 677 | 8,869 | 183 | |

MINERAL PRODUCTION IN 1927

^a The figures relate only to active mines of commercial size that produced coal in 1927. The number of such mines in Iowa was 183 in 1927; 193 in 1926; and 207 in 1925.

Methods of mining in 1927: The tonnage by hand was 247,751; shot off the solid, 1,752,197; cut by machines, 867,885; not specified, 81,789.

Size classes of commercial mines in 1927: There were 5 mines in Class 2 (100,000 to 200,000 tons) producing 27.8 per cent of the tonnage; 12 in Class 3 (50,000 to 100,000 tons) with 29.8 per cent; 41 in Class 4 (10,000 to 50,000 tons) with 30.0 per cent; and 125 in Class 5 (less than 10,000 tons) producing 12.4 per cent.

GYPSUM

Less gypsum was mined in 1927 than in 1926 or 1925, but at the same time more was sold, both crude and calcined, than in 1926, and more was sold calcined than in 1925. The industry evidently recovered from the slight setback of 1926 and is continuing its upward progress. This is evidently attributable to the diversification of products in the industry and their application to an increasingly wider range of usefulness.

The figures herewith tell the tale of progress.

Gypsum production in 1926 and 1927

| Iowa | | | | |
|--|-------------|--------------|-------------|--------------|
| | 1926 | | 1927 | |
| | <i>tons</i> | <i>value</i> | <i>tons</i> | <i>value</i> |
| Crude gypsum mined | 802,910 | | 792,159 | |
| Sold crude—cement mills for agriculture, etc. | 125,956 | \$ 268,507 | 138,375 | \$ 384,024 |
| | 3,847 | 28,347 | 1,262 | 7,677 |
| Total sold crude | 129,803 | 296,854 | 139,637 | 391,701 |
| Sold calcined—stucco | 30,355 | 236,804 | 18,743 | 115,267 |
| neat and sanded plaster | 402,169 | 3,007,628 | 379,702 | 2,711,701 |
| plaster of paris (a) | 4,278 | 41,047 | 6,624 | 51,317 |
| wall and plaster board | 87,395 | 2,605,745 | 104,851 | 2,603,155 |
| partition tile (b) | 18,481 | 171,621 | 55,516 | 487,844 |
| insulating, etc., | 10,820 | 228,504 | 18,869 | 352,512 |
| Total sold calcined | 553,498 | 6,291,349 | 584,305 | 6,321,796 |
| Total sold | 683,201 | 6,588,203 | 723,942 | 6,713,497 |
| United States | | | | |
| Plants active | 59 | | 60 | |
| Total mined | 5,623,441 | | 5,346,888 | |
| Sold crude | 961,363 | \$2,509,885 | 965,371 | \$2,388,663 |
| Sold calcined | 4,015,974 | 44,211,334 | 3,912,211 | 39,785,791 |
| Total sales | 4,977,337 | 46,721,219 | 4,877,582 | 42,174,454 |

(a) Includes dental plaster, sales to plate glass works.

(b) Includes roofing tile, special tile or block.

LIMESTONE AND LIME

In the discussion of mineral production in 1926 the statement was made that the increase in output of stone constituted one of the bright spots in the mineral industry. That being true the spot seems to be brightening and broadening, in a general way at least, if we may judge from the data shown in the tables given below. Increases were shown in 1927 in the major branches of the industry, although some branches showed declines. These

fluctuations may be seen by inspection of the appended summary.

Production of Stone and Lime, 1926 and 1927

| Kind | 1926 | | 1927 | | Change | |
|----------------------------|---------|----------|-----------|-----------|----------|----------|
| | tons | value | tons | value | tons | value |
| Building | ----- | ----- | } 3,160 | \$ 4,869 | -2,990 | \$ 2,292 |
| Rubble | 6,150 | \$ 7,161 | | | | |
| Riprap | 91,150 | 87,756 | 124,400 | 123,321 | +33,250 | 35,565 |
| Concrete and road metal | 627,290 | 599,490 | 866,590 | 839,463 | +239,300 | 239,973 |
| Ballast | 75,190 | 69,670 | 105,140 | 93,773 | +29,950 | 24,103 |
| Flux | 14,280 | 17,677 | 9,550 | 12,146 | -4,730 | 5,531 |
| Agriculture | 114,700 | 101,620 | 163,680 | 156,069 | +48,980 | 54,449 |
| Sugar, lime, others | 15,711 | 68,767 | 5,536 | 38,392 | -10,175 | 30,375 |
| | 944,371 | 952,141 | 1,278,056 | 1,267,033 | +333,685 | 315,892 |

Production of Limestone and Lime in 1927

| Counties | No. Pro- ducers | Building stone, rubble, riprap* | | Concrete, road metal | | Other uses† | | Total | |
|--|--------------------|------------------------------------|----------------|-------------------------|----------------|----------------|----------------|------------------|------------------|
| | | tons | value | tons | value | tons | value | tons | value |
| Black Hawk (2), Cerro Gordo (1) | 3 | | | 64,939 | \$ 74,231 | 11,046 | \$ 5,970 | 76,005 | \$ 80,251 |
| Clayton (2), Jackson (1) | 3 | 83,314 | \$ 80,967 | | | (a) | | 83,314 | 80,967 |
| Dubuque | 4 | 78,787 | 89,775 | (a) | | | | 78,787 | 89,775 |
| Hardin (1), Mitchell (1), Winneshiek (2) | 4 | | | 111,720 | 114,342 | 53,315 | 57,797 | 165,035 | 172,139 |
| Johnson (1), Linn (2) | 3 | | | 132,576 | 196,947 | 15,000 | 16,500 | 147,576 | 213,447 |
| Jones | 3 | 10,325 | 10,892 | 11,760 | 11,760 | 5,544 | 4,139 | 27,629 | 26,791 |
| Lee (2), Louisa (2) | 4 | 8,112 | 10,111 | 59,238 | 91,444 | (b) | | 67,350 | 101,455 |
| Marshall | 3 | | | 209,150 | 113,849 | 100,050 | 90,015 | 309,200 | 204,864 |
| Scott | 3 | 18,978 | 25,282 | 257,082 | 210,300 | 68,046 | 61,812 | 344,106 | 297,394 |
| Total for 1927 | 30 | 127,560 | 128,190 | 866,590 | 839,463 | 283,906 | 299,380 | 1,278,056 | 1,267,033 |
| Totals for 1926 | 27 | 97,300 | 94,917 | 627,290 | 599,490 | 219,781 | 257,734 | 944,371 | 952,141 |

* Includes: Building stone and rubble, 4 operators, 3,160 tons, value \$4,869; Riprap, 12 operators, 124,400 tons, value \$123,321.

† Includes: Railroad ballast, 4 operators, 105,140 tons, value \$93,773; Flux, 4 operators, 9,550 tons, value \$12,146; Agriculture, 17 operators, 163,680 tons, value \$156,069; Sugar factories, lime, other uses, 4 operators, 5,536 tons, value \$38,392.

(a) Included in Building stone, etc.

(b) Included in Concrete, etc.

LIMESTONE AND LIME IN 1927

Scott was the leading county, as for several years past, in both quantity and value. Marshall followed in second place, with Hardin, Johnson, Dubuque and Black Hawk holding the succeeding positions. The high place that Johnson and Linn counties held in values of output was due to the relatively higher prices received for road metal. Hardin has attained a prominent position in recent years since the Iowa Limestone Co. began producing crushed stone in large amounts. The total amount of crushed stone sold or used by producers in 1927 was 971,730 tons, valued at \$932,236. This included concrete, road metal and railroad ballast, but not fluxing or agricultural stone.

Production of crushed stone in the United States amounted to 94,948,770 tons, valued at \$97,474,267. In addition 21,666,070 tons of flux, valued at \$15,985,525, and 2,206,470 tons of agricultural limestone, valued at \$3,360,704, were prepared and sold. Total production of stone amounted to 136,345,260 tons, valued at \$198,661,622.

SAND AND GRAVEL

The amount of sand produced and sold in Iowa in 1927 was 147,175 tons greater than that sold in 1926, but the amount received was \$41,701 less. In the case of gravel, however, both output and value increased, the former by 1,131,986 tons or 83 per cent, the latter by \$311,871, or 35 per cent. This increase is accounted for almost entirely by the greatly enlarged use of gravel for paving and roadmaking, an increase that amounted to 1,131,638 tons, or 171 per cent. The total production also shows a gratifying increase—of 1,279,161 in tonnage and \$270,170 in value—again owing very largely to road making activities. The summary table shows output and values of the various types of material, also the average prices received in 1927.

OUTPUT OF SAND AND GRAVEL

461

Summary of Sand and Gravel production, 1926 and 1927

| Material | 1926 | | | 1927 | | | Aver. price |
|--------------------------|----------|---------------------|-----------|----------|---------------------|-----------|-------------|
| | No. pits | tons | value | No. pits | tons | value | |
| <i>Sand</i> | | | | | | | |
| Molding | 5 | 27,843 | \$ 23,259 | 3 | 14,522 | \$ 11,231 | \$0.77 |
| Structural | 50 | 664,062 | 354,341 | 45 | 583,339 | 268,056 | 0.46 |
| Paving | 30 | 524,761 | 235,285 | 29 | 802,974 | 292,504 | 0.36 |
| Cutting, grinding, blast | 3 | 13,688 | 14,555 | | | | 2.27 |
| Engine | 11 | 43,091 | 30,225 | 9 | 34,171 | 18,102 | 0.53 |
| Filter | 4 | 10,773 | 2,882 | 4 | 13,378 | 17,714 | 1.32 |
| R. R. ballast | 5 | 47,438 | 16,616 | 6 | 30,226 | 11,292 | 0.37 |
| Other | 7 | 17,551 ^a | 8,988 | 6 | 17,772 ^b | 25,551 | |
| Total sand | | 1,349,207 | 686,151 | | 1,496,382 | 644,450 | |
| <i>Gravel</i> | | | | | | | |
| Structural | 39 | 307,610 | 282,125 | 36 | 362,512 | 338,950 | 0.94 |
| Paving | 34 | 661,782 | 430,777 | 36 | 1,793,420 | 725,986 | 0.40 |
| R. R. ballast | 13 | 377,472 | 162,983 | 13 | 324,916 | 129,220 | 0.40 |
| Other | 4 | 5,911 | 6,970 | 3 | 3,913 | 570 | 0.15 |
| Total gravel | | 1,352,775 | 882,855 | | 2,484,761 | 1,194,726 | |
| Total production | | 2,701,982 | 1,569,006 | | 3,981,143 | 1,839,176 | |

^a Includes fire or furnace sand and sand for miscellaneous uses.

^b Includes cutting, grinding and blast sand, fire or furnace sand (Aver. price, \$0.78 per ton), other sands (Aver. price, \$0.30 per ton).

The detailed tables showing production in the different counties indicate that Polk county yielded to Muscatine county the leadership she held the previous year. This change again came about through the great increase in production of roadmaking sand and gravel in Muscatine county, for the output of structural material was much greater in Polk than in Muscatine. These statements do not include the noncommercial production of gravel by the State Highway Commission. Other leading counties were, in order of production, Sac, Cerro Gordo, Linn, Sioux, Cherokee, Johnson and Jackson. Each raised and sold over one hundred thousand tons.

Production the country over amounted to 197,454,269 tons, valued at \$115,529,786, the largest for any year. The leading state was New York, with an output amounting to 19,896,766 tons. Iowa's rank was thirteenth. The distribution of the output was as follows:

MINERAL PRODUCTION IN 1927

Sand and Gravel sold or used by producers in the United States in 1927

| | 1927 | | |
|------------------------------|-------------------|--------------|----------------|
| | <i>Short tons</i> | <i>Value</i> | <i>Average</i> |
| Sand: | | | |
| Glass | 2,171,693 | \$ 3,257,790 | \$1.50 |
| Molding | 4,194,975 | 4,458,508 | 1.06 |
| Building | 40,737,377 | 22,198,767 | .54 |
| Paving | 35,606,622 | 17,767,491 | .50 |
| Grinding and polishing | 1,686,762 | 2,193,690 | 1.30 |
| Fire or furnace | 410,801 | 452,835 | 1.10 |
| Engine | 2,618,890 | 1,640,736 | .63 |
| Filter | 74,674 | 155,137 | 2.08 |
| Other | 6,086,545 | 2,166,444 | .36 |
| | 93,588,339 | 54,291,398 | |
| Gravel: | | | |
| Building | 30,432,031 | 21,947,666 | .72 |
| Paving | 44,891,975 | 29,887,365 | .67 |
| Railroad ballast | 28,541,924 | 9,403,357 | .33 |
| | 103,865,930 | 61,238,388 | |
| Grand total | 197,454,269 | 115,529,786 | .59 |
| Grand total for 1926 | 183,100,818 | 111,338,701 | .61 |

OUTPUT OF SAND IN 1927

463

Production of Sand and Gravel in 1927—Sand

| Counties | Producers | Structural sand | | Paving and other sand <i>a</i> | | Total sand | |
|---|-----------|-----------------|-----------|--------------------------------|-----------|------------|-----------|
| | | tons | value | tons | value | tons | value |
| Black Hawk (1), Butler (2), Fayette (1) ---- | 4 | 40,175 | \$ 24,040 | <i>b</i> | | 40,175 | \$ 24,040 |
| Boone (1), Marshall (2) ---- | 3 | 27,818 | 14,234 | <i>b</i> | | 27,818 | 14,234 |
| Buena Vista (0), Clay (2), Dickinson (0), Sac (1) ----- | 3 | 36,084 | 12,802 | <i>b</i> | | 36,084 | 12,802 |
| Cerro Gordo (2), Floyd (1), Franklin (1), Hardin (1) ----- | 5 | 38,504 | 18,873 | 88,565 | \$ 43,165 | 127,069 | 62,038 |
| Cherokee (1), Plymouth (2) -- | 3 | <i>c</i> | | 65,833 | 22,496 | 65,833 | 22,496 |
| Clayton (2), Dubuque (2), Jackson (1) --- | 5 | 30,460 | 9,431 | 42,628 | 26,546 | 73,088 | 35,977 |
| Clinton (1), Lee (2), Scott (2) ----- | 5 | 43,082 | 21,370 | 38,823 | 21,052 | 81,905 | 42,422 |
| Dallas (0), Marion (0), Wapello (1) --- | 1 | <i>d</i> | | <i>d</i> | | <i>d</i> | |
| Emmet (1), Humboldt (1), Palo Alto (1) -- | 3 | 26,748 | 9,911 | ----- | ----- | 26,748 | 9,911 |
| Johnson (2), Linn (2) ----- | 4 | 66,954 | 44,392 | 207,370 | 129,410 | 274,324 | 153,802 |
| Muscatine ----- | 6 | 46,490 | 25,142 | 270,138 | 73,046 | 316,628 | 98,188 |
| Polk ----- | 8 | 172,892 | 61,305 | 82,136 | 24,881 | 255,028 | 86,186 |
| Sioux ----- | 5 | 40,120 | 19,560 | 43,975 | 20,550 | 84,095 | 40,110 |
| Story (0), Webster (1) --- | 1 | <i>d</i> | | <i>d</i> | | <i>d</i> | |
| Totals ----- | 56 | 583,339 | 268,056 | 913,043 | 376,394 | 1,496,382 | 644,450 |
| Totals for 1926 .. | 70 | 664,062 | 354,341 | 685,145 | 331,810 | 1,349,207 | 686,151 |

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

b Included with structural sand.

c Included with paving sand.

d Included with paving gravel.

Production of Sand and Gravel in 1927—Gravel

| Counties | Producers | Structural gravel | | Paving and other gravel <i>e</i> | | Total sand and gravel | | Total quantity washed | |
|--|-----------|-------------------|-----------|----------------------------------|-----------|-----------------------|-----------|-----------------------|-----------|
| | | tons | value | tons | value | tons | value | tons | value |
| Black Hawk (1), Butler (1), Fayette (1) | 3 | 11,161 | \$ 14,725 | <i>f</i> | | 51,336 | \$ 38,765 | 47,961 | \$ 37,515 |
| Boone (1), Marshall (2) | 3 | 20,470 | 13,044 | <i>f</i> | | 49,428 | 27,657 | 35,878 | 23,672 |
| Buena Vista (1), Clay (1), Dickinson (1), Sac (2) | 5 | <i>d</i> | | 319,684 | \$134,344 | 355,768 | 147,166 | 132,417 | 82,245 |
| Cerro Gordo (2), Floyd (0), Franklin (0), Hardin (1) | 3 | <i>d</i> | | 105,037 | 112,176 | 232,106 | 174,212 | 228,102 | 173,512 |
| Cherokee (3), Plymouth (1) | 4 | <i>d</i> | | 121,298 | 67,413 | 187,131 | 90,309 | 94,331 | 57,423 |
| Clayton (0), Dubuque (2), Jackson (1) | 3 | 26,193 | 19,212 | 73,992 | 48,464 | 152,916 | 87,907 | 120,993 | 70,683 |
| Clinton (2), Lee (1), Scott (2) | 5 | 15,505 | 16,915 | 21,429 | 15,255 | 118,839 | 74,592 | 25,860 | 11,885 |
| Dallas (1), Marion (1), Wapello (1) | 3 | <i>d</i> | | 123,774 | 71,890 | 123,774 | 71,890 | 123,774 | 71,890 |
| Emmet (1), Humboldt (1), Palo Alto (2) | 4 | 10,944 | 13,761 | 81,920 | 12,310 | 119,612 | 35,982 | 36,248 | 22,296 |
| Johnson (2), Linn (<i>f</i>) | 2 | <i>b</i> | | <i>a</i> | | 274,324 | 153,802 | 274,324 | 153,802 |
| Muscatine | 6 | 57,927 | 55,073 | 332,724 | 127,426 | 707,169 | 279,687 | 696,531 | 271,945 |
| Polk | 7 | 83,763 | 109,942 | 85,057 | 68,816 | 427,648 | 264,944 | 404,179 | 253,111 |
| Sioux | 3 | 33,600 | 20,525 | 35,250 | 19,500 | 152,935 | 80,135 | 139,950 | 76,335 |
| Story (1), Webster (2) | 3 | <i>d</i> | | 62,800 | 12,900 | 62,800 | 12,900 | 8,000 | 6,725 |
| Highway Comm. | 1 | | | 945,000 | 283,500 | 945,000 | 283,500 | | |
| Totals | 55 | 362,512 | 338,950 | 2,122,249 | 855,776 | 3,981,143 | 1,839,176 | 2,419,280 | 1,340,037 |
| Totals for 1926 | 63 | 307,610 | 282,125 | 1,045,165 | 600,730 | 2,701,982 | 1,569,006 | 2,294,289 | 1,444,995 |

b Included with structural sand.

c Included with paving sand.

d Included with paving gravel.

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

f Included with structural gravel.