
**MINERAL PRODUCTION IN IOWA
IN 1923 AND 1924**

BY

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MINERAL PRODUCTION IN IOWA IN 1923

1921

Products	Unit	Quantity	Value
Cement	Bbl. of 376 lb.	4,151,439	\$ 7,439,983
Clay products			5,711,583
Coal	short tons	4,531,392	17,256,800
Gypsum	short tons	301,587	2,922,700
Mineral waters	gallons	21,100	2,105
Natural gas	M cubic feet	700	300
Sand and gravel	short tons	2,641,982	1,726,958
Stone and lime	short tons	423,279	563,427
			\$35,625,170

1922

Cement	Bbl. of 376 lb.	4,475,074	\$ 7,709,313
Clay products			5,739,449
Coal	short tons	4,335,161	16,119,000
Gypsum	short tons	452,451	4,146,182
Mineral waters	gallons	25,561	3,788
Natural gas	M cubic feet	460	230
Sand and gravel	short tons	2,690,798	1,752,233
Stone and lime	short tons	627,443	719,203
			\$36,189,398

1923

Cement	Bbl. of 376 lb.	5,570,675	\$10,351,971
Clay products			7,033,924
Coal	short tons	5,710,735	20,517,000
Gypsum	short tons	566,724	5,368,532
Mineral waters	gallons	258,831	8,907
Natural gas	M cubic feet	80	172
Sand and gravel	short tons	3,597,160	2,181,881
Stone and lime	short tons	611,866	775,134
			\$46,237,521

The output of minerals and mineral products in Iowa during 1923 had a higher value than that of any preceding year in the history of the state with the exception of the abnormal year 1920, when the value of the state's mineral output shot up twenty millions of dollars in one year, after which it dropped back twenty-two millions the next year. The production in 1923 seems to represent a healthy growth and a natural reaction from the de-

¹ The statistics for 1923 were collected by the Iowa Geological Survey in cooperation with the United States Geological Survey, with the exception of data on clay products, which were compiled by the Bureau of the Census.

pression of the two preceding years. It is noteworthy that the increase in value and quantity of output was not limited to one item but was shared by all the major branches of the mineral industry. This increase amounted to \$10,048,123 over the output of the preceding year. Perhaps the most striking increase was that of nearly three millions of dollars in the value of the cement shipments, although the increase in the output of gypsum products of \$1,222,350 is also worthy of note.

The following table shows the value of the mineral production in Iowa during the ten years ending 1923.

Production of minerals from 1914 to 1923

Year	Coal	Clay wares	Gypsum	Cement	Other (a)	Total
1914	\$13,364,070	\$ 6,405,995	\$1,321,457	\$ 4,008,915	\$1,201,428	\$26,301,865
1915	13,577,608	6,749,088	1,278,128	4,119,952	1,338,174	27,062,950
1916	13,530,383	7,383,289	1,496,795	5,063,647	1,692,367	30,210,284
1917	21,096,408	7,540,213	2,041,997	6,870,863	1,663,206	39,336,372
1918	24,703,237	5,315,143	1,946,414	5,423,926	1,353,289	38,742,009
1919	17,352,620	8,125,324	2,634,444	7,798,347	1,977,048	37,882,183
1920	30,793,847	10,489,232	4,422,965	8,742,854	2,837,694	57,250,317
1921	17,256,800	5,711,583	2,922,700	7,439,983	2,294,104	35,625,170
1922	16,119,000	5,739,449	4,146,182	7,709,313	2,475,454	36,189,398
1923	20,517,000	7,033,924	5,368,532	10,351,971	2,966,094	46,237,521

(*) Includes iron ore, lead and zinc, mineral waters, natural gas, potash, sand and gravel, stone and lime, ferroalloys.

COAL.

The production of coal showed a gratifying increase in 1923 over that of the preceding year, insofar as total tonnage and total value were concerned, as the former showed an increase of over one and a third millions of tons and the latter one of over four million dollars. However, the average value per ton at the mines declined from \$3.72 in 1922 to \$3.59 in 1923, a drop of thirteen cents. It may be noted that the larger output was made by a smaller number of mines, as there were forty-three fewer operators in 1923 than in the preceding year. Also the number of miners was less by 1,409 in 1923. But to offset these decreases the average number of days worked was fifty more in 1923 than in 1922 and hence the output might well be considerably larger.

Monroe county, with only nine producers operating fourteen mines, was in the lead, in both tonnage recovered and value received. In contrast with mining conditions in Monroe was the case of Appanoose county, the second in rank, in which forty-

two companies operated fifty-four mines. The next largest producers in order of their output were Marion, Lucas, Polk, Dallas, Boone and Jasper. The tonnage of the Lucas county mines was somewhat larger than that of the mines in Polk county but the value was slightly less, owing to the higher price per ton received by the Polk county operators.

The appended table will show by counties the coal production of 1923 with a comparison of the totals with those for 1922.

Coal Production in 1923 by Counties

County	Producers	Loaded at mine for shipment	Sold to local trade and used by employees	Used at mine for steam and heat	Total		Average value per ton	Number of employees			Average number of days worked
		Short tons	Short tons	Short tons	Short tons	Value		Under-ground	Surface	Total	
Appanoose	42	863,671	48,737	19,259	931,667	\$ 3,464,000	\$3.72	2852	248	3,100	146
Boone	5	216,092	46,235	2,107	264,434	1,222,000	4.62	617	51	668	178
Dallas	5	527,520	14,430	3,911	545,861	1,915,000	3.51	918	90	1,008	213
Guthrie(1), Jefferson(1), Keokuk(1)	3	.....	6,449	.....	6,449	20,000	3.01, 3.00, 3.33	20	1	21	100, 183, 120
Jasper	3	81,852	15,223	6,316	103,391	363,000	3.51	192	27	219	142
Lucas(2), Warren(3)	5	725,001	6,700	23,788	755,499	2,612,000	3.45, 3.60	909	86	995	192, 174
Mahaska	8	Incl. in "Local trade"	37,411	Incl. in "Local trade"	37,411	130,000	3.47	84	7	91	169
Marion	16	675,054	42,686	22,577	740,317	2,478,000	3.35	1,187	111	1,298	203
Monroe	9	1,490,213	32,536	35,033	1,557,782	5,510,000	3.53	2,231	180	2,411	198
Page(2), Taylor(1)	3	9,954	18,685	.....	28,639	136,000	4.57, 5.00	71	6	77	212, 230
Polk	15	380,606	274,802	12,423	667,831	2,428,000	3.63	1,249	122	1,371	191
Van Buren(2), Wayne(2) Wapello	4	21,927	7,710	.....	29,637	105,000	2.63, 3.95	99	7	106	231, 181
Small mines	14	Incl. in "Local trade"	33,067	Incl. in "Local trade"	33,067	108,000	3.27	77	6	83	146
		8,750	.....	.....	8,750	26,000	3.00	.....	.....	.....	.....
Production in 1922	142	5,027,502	556,180	127,053	5,710,735	20,517,000	3.59	10,506	942	11,448	181
Difference in 1923	185	3,653,352	579,907	101,902	4,335,161	16,119,000	3.72	11,846	1,011	12,857	131
	-43	+1,374,150	- 23,727	+ 25,151	+1,375,574	+4,398,000	.13	- 1,340	- 69	- 1,409	+ 50

The following is the list of operators during 1923 and 1924:

Adams County

Joe Aukeny, Villisca
Bixler Coal Co., Corning
Pleasant Valley Coal Co., Nodaway
Ruth Coal Co., Carbon

Appanoose County

Acken Coal Co., Mystic
Appanoose Coal & Fuel Co., Mystic
Armstrong Coal Co., Commerce Bldg.,
Kansas City, Mo.
Barrett Coal Co., Mystic
Beggs Coal Co., Mystic
Big Three Coal Co., Centerville
Bradshaw Coal Co., Dean
Brazil Coal Co., Brazil
Caldwell Coal Co., Exline
Carbon Fuel Co., Centerville
Center Coal Co., Centerville
Centerville Block Coal Co., Centerville
Citizens Coal Co., Centerville
Clark Coal Co., Daniel Clark, Center-
ville
Diamond Block Coal Co. (Lodwick
Bros.), Mystic
Domestic Coal Co., Cincinnati
Duff Coal Co., Mystic
Eagle Coal Co., Centerville
Egypt Coal Co., Mystic
Farmers Coal Co., Mystic
Fisher Coal Co., R. No. 1, Plano
Fowler & Wilson Coal Co., Ottumwa
Gillispie & Lovendusky Coal Co.,
Mystic
Gott Coal Co., Centerville
Grandon & Anders Coal Co., Plano
Harkes Coal Co., Keith & Perry
Bldg., Kansas City, Mo.
Hawkeye Coal Co., Mystic
Helman Bros. Coal Co., Plano
High Test Coal Co., Centerville
Hooten Bros. Coal Co., C. P. Houser,
Seymour
Hunt Bros. Coal Co., Mystic
Interurban Coal Co., Mystic
Iowa Block Coal Co., Exline
J. A. Koontz, Centerville
Lee & Jones Coal Co., Mystic
Liberty Coal Co., Mystic
Livingood Coal Co., Centerville
Allen Long Coal Co., Mystic
W. W. Lowe, Brazil
McConville Coal Co., Centerville
Midway Coal Co., Centerville
Monitor Coal Co., Centerville
Murray & Askern Coal Co., R. No. 1,
Mystic
Mystic Coal Co., Mystic
National Coal Mining Co., Lincoln,
Nebr.
New Oriental Coal & Mining Co.,
Centerville

New Phoenix Coal Co., Brazil
North Hill Coal Co., Centerville
Peacock Coal Co., Brazil
Potier Coal Co., Mystic
Prairie Coal Co., Centerville
Rinehart Coal Co., Plano
Roach Coal Co., R. No. 1, Plano
Rosebrook Coal Co., Mystic
Ryals-Yagzy Coal Co., Dean
Shamrock Coal Co., Rathbun
Star Coal Co., Mystic
Sterling Coal Co., Centerville
Sunshine Coal Co., Centerville
Thistle Coal Co., Cincinnati
United States Coal Co., Centerville
Winifred Coal Co., Mystic
Woodland Coal Co., 16 West Wash-
ington St., Centerville

Boone County

Black Diamond Coal Co., c/o A.
Johnson, Boone
Boone Coal Co., Boone
McCaskey Coal Co., Pilot Mound
Ogden Coal Co., Boone
Sayre Coal Co., 201—7th St., Des
Moines
Scandia Coal Co., 606 Grand Ave.,
Des Moines
South Side Coal Co., Fraser

Dallas County

Dallas Coal Co., 326 Liberty Bldg.,
Des Moines
Norwood-White Coal Co., Des Moines
Radiant Coal Mining Co., Ottumwa
Scandia Coal Co., Des Moines
Shuler Coal Co., Des Moines

Greene County

Buckeye Coal Co., Rippey
Carpenter Coal Co., Moingona

Guthrie County

W. H. Scott, Guthrie Center, R. R.
No. 5

Jasper County

Acme Coal Co., Prairie City
Colfax Consolidated Coal Co., Colfax
Newton Coal Co., Newton
Sunny Brook Coal Co., Colfax

Jefferson County

W. F. Faulkner Coal Co., Fairfield
C. S. Henness, Fairfield
O. S. Sedgwick Coal Co., Fairfield
Jos. Voight Coal Co., Batavia

Keokuk County

Big Four Coal Co., What Cheer
Carson Bros., What Cheer
Newcomb Bros. Coal Co., What Cheer

Lucas County

Central Iowa Fuel Co., Des Moines
Iowa-Nebraska Coal Co., Des Moines

Mahaska County

Jay Beadle Coal Co., Beacon

- Bloes & Gyttes Coal Co., Beacon
 Davis & Sons, Beacon
 Rosser Davis Coal Co., Beacon
 Douds & Seams Coal Co., Oskaloosa
 Edwards Bros. Coal Co., Beacon
 Equality Coal Co., Albia
 Fedro Coal Co., R. F. D., Givin
 Fisher Coal Co., Evans
 Frehn & Cons Coal Co., Oskaloosa
 Givin Coal Co., Givin
 William Griffiths Coal Co., Oskaloosa
 Griffiths & Lloyd Coal Co., Beacon
 Herbig Coal Co., Oskaloosa
 Hynick Coal Co., Given, R. R. No. 1
 Larson Coal Co., Beacon
 Lee & Kuntz Coal Co., What Cheer
 Nelson & Knight Coal Co., Rose Hill
 Nelson Bros., Oskaloosa
 O'Brien & Evans Coal Co., Evans
 Reese & Ellis Coal Co., R. F. D., Givin
 Williams Coal Co., New Sharon
 Dennis Wymore Coal Co., New Haven
- Marion County*
 George Anderson Coal Co., Knoxville
 Black Diamond Coal Co., Dallas
 Perry Brown Coal Co., Knoxville
 Geo. L. Burt Coal Co., Knoxville
 Capitol City Coal Co., Cordova
 Consolidated Ind. Coal Co., 139 West
 Van Buren St., Chicago, Ill.
 Des Camp Bros. Coal Co., Flagler
 Dunreath Coal & Mining Co., Des
 Moines
 A. C. Geery, Harvey
 Gold Goose Coal & Mining Co., Albia
 Hayes Bros. Coal Co., Knoxville
 Honey Creek Coal Co., Knoxville
 Horse Shoe Coal Co., (Dupont & Vil-
 lont) Bussey
 Knox Coal Co., Knoxville
 McCagg Coal & Mining Co., Central
 Life Bldg., Des Moines
 Melcher Coal Co., Melcher
 Midland Coal Co., R. F. D., Knoxville
 Mulkey & Thomas, Knoxville
 Pershing Coal Co., Des Moines
 Red Rock Coal Co., Des Moines
 Success Coal Co., Otley
 Vernon Coal Co., Dallas
- Monroe County*
 Albia Coal Co., Ottumwa
 Central Coal Co., Oskaloosa
 Consolidation Coal Co., Bucknell
 Crescent Coal Co., Oskaloosa
 Graham Coal Co., Avery
 Head Coal Co., Albia
 Hocking Coal Co., Hocking
 Larson Air Line Coal Co., Albia
 Maple Coal Co., Des Moines
 Mashak & Willard Coal Co., Lovilia
 Rex Fuel Co., Lovilia
 Sheriff Coal Co., Oskaloosa
 Smoky Hollow Coal Co., Albia
- Page County*
 City Fuel Co. (Evans Coal Co.),
 Clarinda
 Pearson Coal Co., Clarinda
- Polk County*
 Acme Coal Mining Co., Des Moines
 Adelphi Coal & Mining Co., 2300
 East 24th St., Des Moines
 Beck Coal & Mining Co., Des Moines
 Bennett Bros. Coal Co., Des Moines
 Bloomfield Coal & Mining Co., Des
 Moines
 Des Moines Coal Co., 910 West Grand
 Ave., Des Moines
 Des Moines Ice & Fuel Co., Des
 Moines
 Diamond Block Coal Co., 307 Polk
 Bldg., Des Moines
 Diamond Joe Coal Co., Runnells
 Economy Coal Co., Des Moines
 Liberty Coal Mining Co., 807 Locust
 St., Des Moines
 Norwood-White Coal Co., Des Moines
 Saylor Coal Co., 606 Grand Ave., Des
 Moines
 Sprague Coal & Mining Co., Berwick
 Urbandale Coal Co., Des Moines
 Wright Coal Co., 606 Grand Ave., Des
 Moines
 X. L. Coal Co., Des Moines
- Taylor County*
 Bean Coal Co., New Market
 New Market Coal Co., New Market
- Van Buren County*
 Blue Jacket Coal Co., (A. L. Cahill)
 Farmington
 J. Daniels & Sons, Douds
 B. F. Donrad Coal Co., R. F. D.,
 Mount Zion
 Hugh Findlay Coal Co., Douds
 Fletcher Coal Co., Stockport
 Albert Gardner Coal Co., Bonaparte
 H. M. Kirby Coal Co., Farmington
 James Tweedy Coal Co., Douds
 Moses Tweedy Coal Co., Fairfield
- Wapello County*
 Charles Akers Coal Co., Ottumwa
 W. J. Box Coal Co., Eldon
 R. E. Cooper Coal Co., Ottumwa
 H. H. Davis Coal Co., R. F. D., Ot-
 tumwa
 W. O. Donaldson Coal Co., Ottumwa
 Joe Genochio Coal Co., Ottumwa
 Gibbs Bros. Coal Co., R. F. D., Ot-
 tumwa
 Glendale Coal Co., 1317 Castle St.,
 Ottumwa
 Glenn Bros. Coal Co., R. F. D., Ot-
 tumwa
 Griffiths Bros. Coal Co., Roger Grif-
 fiths, Beacon
 Hazeltine Coal Co., Ottumwa
 Wm. Henry, Eldon

Louis Kellar Coal Co., Eldon	Speer Bros. Coal Co., R. F. D., Ottumwa
Clarence Lambert Coal Co., Eldon	Swartz Coal Co., Ottumwa
Geo. Latchem Coal Co., R. F. D., Ottumwa	Union Coal Co., Ottumwa
Wm. McIntosh, Jr., Coal Co., Eldon	Valley Coal Co., Ottumwa
Mat Mier Coal Co., 914 E. 4th St., Ottumwa	Wapello Fuel Co., Eddyville
Mier Coal Co., (Wm. Mier) R. R. No. 8, Ottumwa	Homer Weist Coal Co., Eldon
Herb Orr Coal Co., Eldon	J. M. Welch Coal Co., Ottumwa
Howell Price Coal Co., Ottumwa	Wickam Coal Co., Ottumwa
Ramsey Coal Co., Ottumwa	<i>Warren County</i>
Richard Reese Coal Co., Ottumwa	Des Moines Ice & Fuel Co., Des Moines
Rutledge Coal Co., R. R. No. 3, Ottumwa	Hartford Coal & Mining Co., Runnells
Seigel-Smith Coal Co., Ottumwa	<i>Wayne County</i>
George Simmer Coal Co., Ottumwa	Rissler & Yocum, Melrose
Simpson Bros. & Howard, Ottumwa	Seymour Coal Co., Seymour
Sinsky Bros., Blakesburg	<i>Webster County</i>
	Lehigh Coal Co., Lehigh

CLAY WARES.

The production of clay wares showed a fine increase in 1923, amounting to \$1,294,475 over the output of 1922. This increase prevailed in every important branch of the industry, for although the tonnage of drain tile made in 1923 was slightly less than that of the year before the price realized was a little greater. The sewer pipe sold increased from 38,359 tons valued at \$681,233 in 1922 to 54,828 tons valued at \$865,676 in 1923. Hollow building tile for walls, including partition, load-bearing, back-up, blocks, furring, book tile, was made in 1923 to the amount of 297,253 tons with a value of \$2,197,515. Other kinds of tile, including floor arch, silo tile, corn-crib tile, conduits, radial chimney blocks, fireproofing and roofing tile, were made to the value of \$216,938. The quantity of vitrified brick sold for paving and other purposes was 31,523,000, with a value of \$513,684. The pottery at Bellevue continued the manufacture of flower pots and other red earthenware, and there was a large increase in the output of miscellaneous wares over the state as compared with that of the previous year.

The table following will show the production by counties, so far as this may be revealed, and a comparison with the previous year.

Production of Clay Wares by Counties in 1923

Counties	Producers	Common brick		Face brick		Hollow building tile		Drain Tile		Other Products(1)	Total Value
		Thousands	Value	Thousands	Value	Tons	Value	Tons	Value	Value	
Appanoose(1), Audubon(2), Benton(4)	7	3,842	\$ 42,496			1,107	\$ 9,260	1,824	17,440	(a)(b)	\$ 89,596
Boone(2), Cerro Gordo(3).....	5	7,587	121,737	5,330	\$ 96,938	158,714	1,208,351	49,754	410,124	(b)	1,849,154
Dallas	5	637	9,881	*	*	45,494	335,935	8,923	48,619		410,695
Clinton(1), Dubuque (1), Fayette(1), Floyd(1), Franklin(1)	5	4,733	59,314	1,975	43,138	12,747	89,229	22,373	190,237		381,918
Guthrie(1), Hamilton(1), Hardin(3), Henry(2)	7	116	1,886			2,290	16,937	20,349	209,361	35,495(a)(c)(d)	263,679
Jackson(1), Jasper(2), Jefferson(1), Johnson(2)	6	648	11,732			1,321	9,793	2,927	21,010	(d)	73,106
Jones(2), Marion(2), Marshall(1), Page(1)	6	1,227	18,342			14,762	87,639	3,715	31,468		137,449
Keokuk(3), Mahaska(2)	5	4,464	55,420	*	*	1,448	9,729	11,320	115,192	(a)(c)	359,057
Polk	7	7,881	110,327	13,162	256,034	22,249	174,266	8,498	84,637	569,346(a)(b)(c)(d)	1,194,610
Pottawattamie(1), Poweshiek(1), Sac(1), Scott(2)	5	640	9,852			9,713	71,208	4,490	40,393		121,453
Story(2), Tama(3), Union(1)	6	1,638	23,496	1,003	19,848	4,000	28,005	3,996	26,249	1,810(d)	99,408
Wapello(1), Warren(1), Washington(3)	5	8,103	106,048	†	†	25,780	189,131	6,298	44,047		339,226
Webster	8	4,478	59,739	1,812	40,237	26,209	184,970	29,211	270,059	701,090(a)(b)(c)(d)	1,256,095
Woodbury	3	26,813	299,060	*	*					(d)	458,475
Counties with less than three producers				6,064	133,996					290,940	
Production in 1922	79	72,558	921,853	29,346	590,191	325,834	2,414,453	173,678	1,508,836	1,598,591	7,033,924
Difference in 1923	+ 10	+ 16,528	+ 193,345	+ 10,836	+ 236,150	+ 17,468	+ 244,085	- 3,216	+ 13,720	+607,175	+1,294,475

* Included with Counties with less than three producers.

† Included with Common brick for these counties.

(1) Includes: (a) Fancy brick, stove lining and miscellaneous brick and tile products, \$105,643; (b) Vitrified brick, \$513,684; (c) Sewer pipe, \$865,676; (d) Pottery, raw clay sold, other clay products, \$113,588.

The report of the Bureau of the Census on Clay Products Industries shows that in 1923 there were 2,287 establishments producing clay wares and that the persons engaged numbered 152,623. The total value of the products including pottery was \$448,834,938. This represented an increase of 60.8 per cent over the output in 1921, which was valued at \$279,749,086. Cost of materials used in 1923 was \$136,917,435, including 10,605,860 tons of coal. The value of the output in the leading states of the Union is given in the table shown herewith.

State	Brick, tile, &c.	Pottery
Pennsylvania.....	\$ 65,500,819	\$ 7,852,092
Ohio.....	57,034,856	42,716,233
Illinois.....	31,537,522	4,562,677
New Jersey.....	22,184,989	23,831,737
New York.....	19,388,572	6,349,393
Missouri.....	18,509,934	94,985
California.....	17,488,167	3,691,325
Indiana.....	13,631,536	2,860,200
Kentucky.....	7,480,512	
Iowa.....	7,033,924	
U. S.....	\$312,813,459	\$114,951,067

Other nonclay products valued at \$21,070,412 bring the total value for the year to the value given above.

The output of different classes of ware in 1923 is shown in the following list.

Class	Quantity	Value	Average value per unit
Common brick, M.....	7,282,181	\$ 94,472,666	\$12.97
Vitrified brick.....	699,269	15,569,670	22.27
for paving, M.....	538,658	13,032,341	24.19
other uses, M.....	160,611	2,537,329	15.80
Face brick, M.....	1,931,175	38,891,834	20.14
Fancy brick, M.....	12,879	252,323	19.59
Enameled brick, M.....	19,502	1,670,852	85.68
Terra cotta, tons.....	138,462	16,486,039	119.07
Hollow building tile, tons.....	3,764,744	28,274,801	7.51
Roofing tile, squares.....	231,462	4,021,722	17.38
Other tile, square feet.....	62,462,615	19,781,435	
Drain tile, tons.....	615,640	5,099,955	8.28
Sewer pipe, tons.....	1,777,584	29,102,511	16.37
Stove lining, tons.....	54,684	1,218,970	22.31
Fire brick, thousands.....	1,134,233	46,676,637	
Other clay products.....		8,111,146	
Clay sold, tons.....	647,768	3,181,898	4.91
Pottery.....		114,951,067	

The United States Geological Survey also reported sales of raw clay amounting to 3,434,660 tons valued at \$11,188,913.

The list given herewith shows the operators who reported production in 1923 and 1924 together with the kinds of clayware which they produced, according to the following schedule: 1, common brick; 2, face brick; 3, fancy brick; 4, building tile; 5, vitrified brick; 6, drain tile; 7, sewerpipe; 8, other products; 9, pottery; 10, raw clay sold. It may be seen from this list that there are a few discrepancies in the table given above. The Iowa Clay Products Company, with offices at Washington, has four plants, two in Keokuk county, one in Washington county and one in Wapello county, but in the table the output of all these is combined under Keokuk county. The Capital City Clay Company of Des Moines has two plants at Des Moines. The Gethmann Brick Company, of Gladbrook, Tama county, has one plant at that town and one at Reinbeck in Grundy county, but the output of both is credited to Tama county.

The Survey wishes to acknowledge the assistance of Mr. A. L. Urick, State Labor Commissioner, in making more complete the list of clay producers in Iowa. A number of names were added from his report on manufactories which were not in the Survey's list. These are indicated by stars opposite the names.

Allamakee County

Postville Mfg. Co., Postville, office Minneapolis, Minn.

Appanoose County

Centerville, Centerville Brick Co., 1

Audubon County

Audubon, Audubon Brick & Tile Works, 1, 4, 6

Kimballton, Crystal Springs Clay Works, 1, 3, 6

Benton County

*Atkins, Rinderknecht Bros.

Belle Plaine, Buckeye Clay Products Co., 4, 5

Garrison, Garrison Brick & Tile Works, 1, 4, 6

Norway, Norway Tile Factory (Mose Trojovsky), 6

Vinton, Aikley Brick & Tile Works, 1, 6

Black Hawk County

*Waterloo, Art Novelty Pottery (William Raab), 9

*Waterloo, Waterloo Granite Brick Co., 1

Boone County

Boone, Boone Brick & Tile & Paving Co., office Des Moines, 1, 2, 5

Boone, Boone Clay Works Company, 1, 2

Fraser, McHose Sand & Tile Co., 1, 4, 6

Buena Vista County

Linn Grove, Linn Grove Brick & Tile Co., 1, 4, 6

*Sioux Rapids, Sioux Rapids Drain Tile Works, 1, 4, 6

Cass County

Atlantic, Atlantic Building Supply Co., 1, 4, 6

Cedar County

*Tipton, Tipton Brick & Tile Works, 1, 4, 6

Cerro Gordo County

Mason City, Mason City Brick & Tile Company, 1, 2, 4, 6

Mason City, National Clay Works, 1, 2, 4, 6

Mason City, North Iowa Brick & Tile Co., 4, 6

Clayton County

*Clayton, Clayton Brick and Tile Co., 1, 4

Clinton County

Dewitt, DeWitt Brick & Tile Works (Brown & Churchill), 1, 6

Dallas County

Adel, Adel Clay Products Co., 1, 2, 4, 6

DeSoto, DeSoto Brick & Tile Co., 1, 2, 6

Redfield, Redfield Brick & Tile Company, 1, 4, 6

Van Meter, Platt Company, Inc., 1, 4, 6

Woodward, Dallas County Clay Co., 4, 6

Dubuque County

*Dubuque, Frank Bentin, 1

*Dubuque, Clayton Brick & Tile Co., 1, 4, 6

Dubuque, John L. Heim & Son, 1

Fayette County

Clermont, Clermont Brick & Sand Co., 1, 2, 4

Floyd County

Rockford, Rockford Brick & Tile Company, 1, 2, 4, 6

Franklin County

*Sheffield, Sheffield Brick & Tile Co., 1, 4, 6

Sheffield, Sheffield Tile Company, 1, 2, 4, 6

*Sheffield, Smith Brick & Tile Co., 1, 4, 6

Grundy County

*Reinbeck, Gethmann Brick Co., office Gladbrook, 2

Guthrie County

Glendon, Glendon Brick & Tile Co. (Robert Goodwin, Jr.), office Menlo, 1, 4, 6

Hamilton County

Webster City, National Sewer Pipe Co., 6, 7, 8

Also has clay pit at Nevada, Story Co., 10

*Webster City, Therm-A-Jug Co., 9

Hardin County

Eldora, Eldora Pipe & Tile Co., 4, 6, 10

*Eldora, Eldora Sand Co., 10

*Eldora, Estate of Henry L. Huff, 10

Henry County

Mount Pleasant, Mount Pleasant Brick & Tile Mfg. Co., 1, 4, 6

Winfield, Winfield Brick & Tile Works (J. E. Pierce), 1, 4, 6

Howard County

*Cresco, (Cresco Brick & Tile Works) C. A. Marshall, 1, 4, 6

Jackson County

Bellevue, Bellevue Clay Products Company, 1, 4, 6, 9

Jasper County

Lynnville, Lynnville Brick & Tile Works (C. H. Newby), 4, 6

Newton, Newton Clay Products Co., 1, 4, 6

Jefferson County

*Batavia, Batavia Brick and Tile Co., 1, 4, 6

Packwood, S. F. Steigleder & Son, 6

Johnson County

Iowa City, Ferd. Goss Brick Yard, 1

Tiffin, Tiffin Tile Company, 1, 6

Jones County

Monticello, Monticello Clay Works (Frank D'Autremont), 6

Center Jct., Center Junction Brick & Tile Co., 6

Keokuk County

Hedrick, Hedrick Tile Works, 1, 4, 6

*Keota, Iowa Clay Products Co., office Washington, 1, 4, 6

- Keswick, Keswick Brick & Tile Company, 6
 *Richland, Iowa Clay Products Co., office Washington, 1, 4, 6
 *What Cheer, Nelson Bros. & Lundberg, 1, 9
 What Cheer, What Cheer Clay Products Co., 4, 6, 7, 8
- Lee County*
 *Fort Madison, Julius Reichelt, 1
- Mahaska County*
 Barnes City, Wilson & Morrow, 1, 4, 6
 New Sharon, Peter Meyer, 1, 6, 8
 *New Sharon, Cecil Bros., 1, 4, 6
 Oskaloosa, Standard Clay Products Co., 1, 2
- Marion County*
 Harvey, Standard Clay Products Co., office Oskaloosa, 4, 6
 Knoxville, Knox Clay Products Co., Inc., 1, 4, 6
- Marshall County*
 Marshalltown, Sieg Brick & Tile Company, 1, 4
- Muscatine County*
 *Muscatine, Charles Stark, clay pipes
- Page County*
 Shenandoah, Lake & Cottrill Brick & Tile Company, 1, 4
- Palo Alto County*
 *Graettinger, Graettinger Tile Works, 6
- Polk County*
 Des Moines, The Capital Clay Company, 1, 2
 Des Moines, Des Moines Clay Company (2 plants), 1, 2, 4
 Des Moines, Des Moines Brick & Tile Co., 4, 6, 10
 Des Moines, Flint Brick Company, 1, 5
 Des Moines, Goodwin Tile & Brick Co., 4, 6
 Des Moines, Iowa Pipe & Tile Co., 6, 7, 8
 *Des Moines, James Maine & Co., 1
 Des Moines, Star Brick Yard, 1
- Pottawattamie County*
 Council Bluffs, Wickham Brothers, 1
- Poweshiek County*
 Deep River, Deep River Brick & Tile Co., 1, 4, 6
 Grinnell, Grinnell Clay Products Co., 1, 4, 6
- Sac County*
 Auburn, Auburn Brick & Tile Company, 4, 6
- Scott County*
 Buffalo, Davenport Brick & Tile Co., office Davenport, 4
 LeClaire, W. E. Martin & Sons, Inc., 1, 4, 6
 *Pleasant Valley, Martin & Sons, 1, 4, 6
- Story County*
 Nevada, Nevada Brick & Tile Works, 1, 4, 6
 *Nevada, National Sewer Pipe Co. (T. J. Lyman), 10
- Tama County*
 Dysart, Dysart Brick & Tile Company, 1, 6
 Gladbrook, The Gethmann Brick Co., 2
 Also has plant at Reinbeck, Grundy Co., 2
 Gladbrook, Gladbrook Press Brick & Tile Co., 1, 2, 6
 *Tama, Tama Brick & Tile Co., 1, 4, 6
 Toledo, Toledo Brick & Tile Co., 1, 4, 6
- Union County*
 Creston, Creston Brick & Tile Works, 1, 2, 4, 6
- Wapello County*
 *Eldon, Iowa Clay Products Co., office Washington, 1, 4, 6
 Ottumwa, Morey Clay Products Co., 1, 2, 4, 6
 *Ottumwa, Ostdeik Brick Works, 1, 4, 6
- Warren County*
 Carlisle, Carlisle Clay Products Co., Inc., 4, 6
- Washington County*
 Crawfordsville, Crawfordsville Brick & Tile Co., 6

- Kalona, Kalona Clay Co., Inc., 1, 4, 6
 Washington, Washington Brick & Tile Works, 1, 4, 6
 Wellman, Iowa Clay Products Company, office Washington, 1, 4, 6
- Webster County*
 Clayworks, Johnson Clay Works Inc., 1, 2, 4
 Fort Dodge, Bradshaw & Company, 1, 2, 4, 6
 *Fort Dodge, Coats Mfg. Co., 4
 Fort Dodge, Fort Dodge Brick & Tile Co., 1, 4
 Fort Dodge, Plymouth Clay Products Co., 6, 7, 8
 Fort Dodge, Vincent Clay Products Co., 4, 6
 Lehigh, Lehigh Sewer Pipe & Tile Co., office Fort Dodge, 6, 7, 8
 *Lehigh, George F. Drain, 10
 Otho, Kalo Brick & Tile Company, office Ft. Dodge, 1, 2, 4, 5, 6
- Woodbury County*
 *Correctionville, Woodbury County Tile Plant, 6
 Sergeant Bluff, Ballou Brick Company, office Kansas City, Mo., 1, 2
 *Sioux City, Lehigh Sewer Pipe & Tile Co., 6, 7
 Sioux City, Tom Green Brick Company, 1
 Sioux City, Sioux City Brick & Tile Co., 1, 2, 8
 *Sioux City, Sioux City Crockery Co., 9
- Wright County*
 Goldfield, Goldfield Brick & Tile Works, 1, 4, 6

CEMENT.

The upward trend in production and shipment of Portland cement which was noted in the report for 1922 continued and was accentuated during 1923. Production rose 34 per cent and shipments 24 per cent in quantity during the later year. These conditions seem to be the result of increased building and road construction activity and were shared in by the country at large, although some districts reported a decrease in construction work as reflected by sales of cement. The magnitude of construction work in the United States is shown by the figures showing value of contracts awarded in the district including Illinois, Indiana, Iowa, Wisconsin, Michigan, Missouri, Kansas, Nebraska and Oklahoma, which amounted to \$1,006,422,000 in 1923.

The statistics showing the condition of the industry in Iowa may be summarized in the following table:

Production of Cement in Iowa, 1921 to 1923

	1921	1922	1923
Production, bbls.	4,590,920	4,272,432	5,732,470
Stock, Dec. 31, bbls.	993,090	790,447	952,242
Shipments, bbls.	4,151,439	4,475,074	5,570,675
Shipments, value	\$7,439,983	\$7,709,313	\$10,351,971
Average factory price per bbl.	\$1.79	\$1.72	\$1.86
Consumption, bbls.	3,118,469	3,242,436	3,624,857
Population, estimated	2,440,948	2,459,411	2,477,874
Consumption per capita, bbl.	1.28	1.32	1.46
Surplus production	1,032,970	1,228,638	1,945,818
Coal used during year, tons			589,117
Annual finished cement capacity of plants, bbls.	5,350,000	5,650,000	6,785,000

The following operators had plants in operation in Iowa in 1923:

Gilmore Portland Cement Co., Gilmore City
 Hawkeye Portland Cement Co., Des Moines
 Lehigh Portland Cement Co., Mason City
 Northwestern States Portland Cement Co., Mason City
 Pyramid Portland Cement Co., Valley Junction.

The Pyramid Portland Cement Company of Des Moines opened a new plant at Valley Junction, at the west margin of Des Moines, on August 15, 1923. This adds two kilns to the capacity of the state's plants. Each kiln is 240 feet long and 10 to 11 1/3 feet in diameter. At the close of the year the plants in operation in the state had a total of twenty-eight kilns. The Pyramid and Hawkeye plants use the wet process, the others use the dry process. All the plants use limestone and clay shale and burn the clinker with coal.

Cement production in the leading states of the Union is shown in the table below. It will be seen that Iowa occupies eighth place in both production and shipments.

State	Plants	Production		Shipments		Average factory price per bbl.	Consumption	
		bbls.		bbls.	Value		bbls.	per capita
Pennsylvania.....	22	38,157,482		38,610,852	\$ 69,792,343	\$1.81	11,281,290	1.23
California.....	9	11,001,910		10,882,802	26,022,156	2.39	10,373,163	2.69
Michigan.....	14	7,619,792		7,466,283	14,038,322	1.88	7,531,664	1.87
Missouri.....	5	7,305,997		7,143,883	13,237,141	1.85	3,492,453	1.01
Illinois.....	4	7,147,906		7,129,208	12,550,100	1.76	12,237,478	1.79
New York.....	9	6,990,174		6,853,062	12,834,471	1.87	15,881,436	1.46
Kansas.....	7	6,025,657		5,878,839	10,868,590	1.85	2,613,070	1.45
Iowa.....	5	5,732,470		5,570,675	10,351,971	1.86	3,624,857	1.46
Ohio.....	6	4,188,755		4,003,321	7,615,741	1.90	8,843,641	1.43
Texas.....	5	4,178,895		4,091,284	8,011,226	1.96	3,328,619	0.67
U.S.....	126	137,460,238		135,912,118	257,684,424	1.90	134,703,313	1.21

The increase in the quantity shipped in 1923 in the various producing states ranged from 8 per cent in Washington to 46 per cent in Alabama and averaged 15 per cent for the country in general. California is again far in the lead in per capita consumption and Iowa ties with New York for tenth place although our state ranks tenth in total consumption while New York ranks

first. Wisconsin occupies the unique position of standing third in per capita use and eighth in total consumption, with shipments of 5,064,000 barrels, although no cement is made in the state. Portland cement was made in twenty-seven states in 1923.

GYPSUM.

The gypsum industry reached the highest point in its history in 1923, both as to the amount of crude gypsum mined and as to the value of the finished product. The improvement which was evident in 1922 continued during 1923 in sales of crude gypsum as well as in those of finished plasters and manufactured products. The following table shows the figures of production during 1923, with those for 1922 in comparison.

Production of Gypsum in 1922 and 1923.

	1922		1923	
	<i>Tons</i>	<i>Value</i>	<i>Tons</i>	<i>Value</i>
Crude gypsum mined.....	536,905		685,041	
Sold crude				
to Portland cement mills.....	80,452	\$223,187	134,566	\$383,322
agricultural gypsum.....	45,062	136,451	329	1,961
Total sold crude.....	125,514	359,638	134,895	385,283
Sold calcined				
as stucco.....	11,691	98,608	17,681	120,130
as mixed wall plaster.....	260,167	2,272,290	315,435	2,505,183
as plaster of Paris, molding, &c.....	3,263	33,341	1,937	21,366
as Keenes cement, dental plaster, &c.....	3,927	75,635	6,085	97,677
as plaster board and wall board.....	23,720	862,061	44,183	1,583,681
As tile and block.....	24,169	444,509	46,508	665,212
Total sold calcined.....	326,937	3,786,544	431,829	4,983,249
Total sold.....	452,451	4,146,182	566,724	5,368,532

The following table will show the growth of the gypsum industry in Iowa during the last ten years.

MINERAL PRODUCTION IN IOWA

Year	Mined	Sold crude		Sold calcined		Total sold	
	Tons	Tons	Value	Tons	Value	Tons	Value
1914	480,404	65,185	\$60,486	335,065	\$1,260,971	400,250	\$1,321,457
1915	495,860	71,909	59,930	335,057	1,218,198	406,966	1,278,128
1916	522,293	60,846	59,297	373,416	1,437,498	434,262	1,496,795
1917	461,864	65,012	110,741	322,198	1,931,256	387,210	2,041,997
1918	327,927	57,719	160,148	218,178	1,786,266	275,897	1,946,414
1919	421,279	69,024	231,432	264,656	2,403,012	333,680	2,634,444
1920	571,895	110,839	414,431	321,400	4,008,534	432,239	4,422,965
1921	350,247	84,659	234,038	216,930	2,688,662	301,587	2,922,700
1922	536,905	125,514	359,638	326,937	3,786,544	452,451	4,146,182
1923	685,041	134,895	385,283	431,829	4,983,249	566,724	5,368,532

The gypsum industry the country over seemed to share in the prosperity enjoyed by the Iowa operators for the total quantity mined in 1923 exceeded that of the previous year by 26 per cent and the value of sales increased by \$5,527,004, or 19 per cent. Iowa was well in the lead for second place, being excelled by New York alone, with Ohio in third position. These states have held these relative positions most of the time for a number of years. The following table summarizes the industry in the United States.

Gypsum production in the United States in 1923

State	Plants	Total mined	Sold crude		Sold calcined		Total value
		Tons	Tons	Value	Tons	Value	
California.....	3	111,832	a	a	24,936	\$374,040	\$670,495
Iowa.....	7	685,041	134,895	\$385,283	431,829	4,983,249	5,368,532
Kansas.....	3	135,019	a	a	71,349	700,490	842,740
Michigan.....	6	586,978	135,616	355,067	341,746	2,897,926	3,252,993
Nevada.....	4	298,390	a	a	226,753	1,891,639	1,952,007
New York.....	8	1,361,116	230,080	717,999	823,241	9,626,746	10,344,745
Ohio.....	3	526,861	a	a	432,511	4,919,375	4,981,542
Oklahoma.....	4	290,121	47,041	125,182	202,323	2,123,713	2,248,895
Texas.....	4	344,104	.....	.....	254,512	2,177,983	2,237,024
Utah.....	3	44,531	a	a	33,520	269,148	286,957
Wyoming.....	4	.....	.....	.....	27,945	176,791	176,791
Others (b).....	16	335,802	c299,610	c993,905	230,713	2,169,619	2,525,434
U.S.....	65	4,753,448	847,242	2,577,436	3,101,378	32,310,719	34,888,155

a Included under Others.

b Alaska, Colorado, Montana, Oregon, South Dakota, Virginia and New Mexico.

c These figures include also output of states entered under a.

The following Iowa plants were operated in 1923:

Centerville Gypsum Co., Centerville, Appanoose Co.

Beaver Products Co., Fort Dodge, Webster Co.
 Universal Gypsum Co., operating the Iowana and Plymouth plants, Fort Dodge
 Wasem Plaster Co., Fort Dodge
 Cardiff Gypsum Co., Fort Dodge
 United States Gypsum Co., Fort Dodge.

SAND AND GRAVEL.

The sand and gravel industry continued the upward trend which had been maintained in 1922 and the total tonnage and total value were materially larger in 1923, the tonnage increasing 955,178 tons and the value by \$454,923, or 36 per cent and 26 per cent respectively. These increases were spread over nearly all branches of the business, the only decreases being in the tonnage of filter sand and the tonnage and value of unclassified sands sold. Perhaps the most notable increase in the industry was in the gravel used as railroad ballast. Probably the rise in the figures for this item is due in part to a special canvass of the railroads which was made by the United States Geological Survey in 1923 to obtain more complete returns as to the non-commercial material used by them. The increase is shown also in the figures for the nation as a whole.

The production and uses of sand and gravel during 1922 and 1923 are summarized in the table below.

Production of sand and gravel in Iowa by uses.

Class	1922		1923	
	Tons	Value	Tons	Value
<i>Sand</i>				
Molding	29,809	\$ 32,613	35,654	\$ 40,238
Building	842,254	466,326	1,004,261	512,413
Grinding and polishing	6,225	6,961	17,225	36,288
Engine	59,778	27,568	61,680	37,627
Paving	286,303	146,030	670,181	310,750
Filter	12,255	4,682	11,968	7,505
Other	76,700	36,835	31,364	20,455
Total	1,313,324	721,015	1,832,333	965,276
<i>Gravel</i>				
Building	328,297	314,541	343,078	331,045
Paving	757,329	629,549	837,558	634,020
Railroad	291,848	87,128	584,191	251,540
Total	1,377,474	1,031,218	1,764,827	1,216,605
Sand and gravel	2,690,798	1,752,233	3,597,160	2,181,881

The output by counties and its distribution among the different classes of these materials are shown in the table appended.

Production of Sand and Gravel in 1923

County	Producers	Building sand	Paving sand	Other sand (a)	Gravel	Total	
						Tons	Value
Black Hawk(2), Boone(2)	4	\$30,968	*	(3)	\$101,057	200,953	\$143,187
Bremer(1), Buena Vista(1), Butler(2), Cerro Gordo(1)	5	15,900	*	(3)	61,983	218,444	87,883
Cherokee(4), Clay(2)	6	43,207	*	(5)	216,556	506,304	273,812
Clayton(2), Clinton(4)	6	*	*	(1)(2)	28,744	91,816	75,069
Dallas(4), Des Moines(1), Dickinson(1), Dubuque(2)	5	9,669	*	(3)(5)	41,431	103,660	60,663
Emmet(1), Fayette(2), Floyd(1), Franklin(1)	5	13,177	-----	(1)	*	31,716	25,811
Fremont(1), Hardin(2), Humboldt(1), Ida(2)	6	17,828	*	\$5,941(3)(5)	*	85,421	61,177
Jackson	3	5,529	*	(3)	30,353	49,776	37,016
Johnson(2), Jones(1), Kossuth(1), Lee(2)	6	21,324	\$16,605	-----	8,461	76,597	46,390
Linn(5), Lyon(2)	8	47,118	34,491	-----	23,545	184,571	105,154
Mahaska(1)	6	12,437	*	(3)	7,637	51,105	25,639
Marion(1), Marshall(1), Monroe(1), O'Brien(1), Osceola(2)	5	40,810	*	66,403(2)(3)(4)(5)	124,371	354,433	260,586
Muscatine	5	*	*	(5)	128,935	377,959	149,073
Palo Alto(1), Plymouth(2), Sac(2)	13	80,211	84,197	9,931(1)(3)(4)(5)	266,739	669,129	441,078
Polk	6	94,156	*	(1)(3)(4)(5)	23,795	203,825	144,275
Scott(2), Story(1), Wapello(3)	8	37,144	*	(4)	25,725	189,647	80,871
Sioux	6	17,337	57,016	(5)	81,104	200,963	155,516
Webster(2), Woodbury(2), Wright(2)	6	1,080	*	-----	7,601	5,829	8,681
Winnesiek	6						
Counties with less than three producers		24,518	118,441	59,838	44,558		
Production in 1922	109	512,413	310,750	142,113	1,216,605	3,597,160	2,181,881
Difference in 1923	102	466,326	146,030	108,659	1,031,218	2,690,798	1,752,233
	+7	+46,087	+164,720	+33,454	+185,387	+906,362	+429,648

* Included in: Counties with less than three producers.

(a) Includes: (1) molding, \$40,238; (2) grinding and polishing, \$36,288; (3) engine, \$37,627; (4) filter, \$7,505; not specified, \$20,455.

Preliminary figures for the industry over the entire country show that there was an increase of 48 per cent in quantity and 41 per cent in value over the figures for 1922. The increase shown in use of railroad ballast amounted to 146 per cent and there was a large increase also in the amount of sand and gravel sold for construction of buildings and pavements. The figures for 1923 include returns from 2,428 sand and gravel plants, which is 443 more than the number represented by the returns for 1922. The

table below will show the quantity and value of the different grades sold in these two years.

Sand and gravel sold in the United States in 1922 and 1923.

Class	1922		1923	
	Short tons	Value	Short tons	Value
Sand:				
Glass	1,768,549	\$ 2,866,366	2,034,958	\$ 3,751,778
Molding	3,839,116	4,478,405	5,559,644	6,730,417
Building	29,375,466	17,574,579	39,234,762	23,751,244
Paving	10,669,772	6,481,601	15,632,419	9,187,468
Grinding and polishing.....	1,183,161	1,732,469	1,456,039	2,361,695
Fire or furnace.....	237,065	336,085	307,794	445,479
Engine	1,685,712	1,288,022	2,033,494	1,535,638
Filter	71,728	142,692	116,520	139,671
Other	864,354	569,701	989,641	570,175
Total	49,694,923	35,469,920	67,365,271	48,473,565
Gravel:				
Building	18,686,176	14,541,169	24,145,463	18,367,713
Paving	17,432,445	11,373,712	26,174,112	17,716,779
Railroad ballast.....	9,053,502	3,232,863	22,247,307	6,345,597
Total	45,172,123	29,147,744	72,566,882	42,430,089
Grand total	94,867,046	64,617,664	139,932,153	90,903,654

Sand and gravel are produced in Iowa by the following firms:

Black Hawk County

Cedar River Sand & Material Co., 908 L. & J. Bldg., Waterloo
Iowa Sand Co., H. C. Matthias, 1721 Franklin St., Waterloo
Waterloo Dredging Co., Waterloo

Boone County

McHose Sand & Tile Co., Frazer; office at Boone
Northwestern Gravel Co., office at Des Moines

Bremer County

H. S. Bunth, Waverly

Buena Vista County

Chicago & North Western Ry. Co., Sioux Rapids

Builer County

Aplington Cement Tile & Block Works, Chas. Willeke, Aplington
Waverly Gravel & Tile Co., Shellrock; office at Waverly

Carroll County

Chicago Great Western R. R. Co., Lanesboro

Cerro Gordo County

Ideal Sand & Gravel Co., Mason City
Chicago, Milwaukee & St. Paul Ry. Co., Plymouth; office at Chicago, Ill.

Cherokee County

M. J. Gillease Co., Cherokee
E. L. Halford & Son, Cherokee
Illinois Central Ry. Co., Cherokee
Northwestern Gravel Co., Quimby

Clay County

John Stolley, Spencer
Spencer Washed Sand & Gravel Co., Spencer

Clayton County

Clayton White Sand Co., Clayton
Langworthy Silica Co., Clayton; office at 902 Federal Bank Bldg., Dubuque

Clinton County

Clinton Sand & Gravel Co., 604 Wilson Bldg., Clinton
 W. J. McAllister, DeWitt; office at 2103 E. 11th St., Davenport
 Ed. Jenner, DeWitt; office at 629 E. Central Park Ave., Davenport
 A. F. Barber, R. D. No. 2, Grand Mound
 John Sampson, Grand Mound

Dallas County

Portland Cement Sand & Gravel Co., Booneville, office at 513 Youngerman Bldg.,
 Des Moines

Des Moines County

Mississippi Sand & Gravel Co., Burlington

Dickinson County

Chicago, Milwaukee & St. Paul Ry. Co., Milford

Dubuque County

Frank Beutin, Garfield-Kniest Sts., Dubuque
 Chicago, Milwaukee & St. Paul Ry. Co., Dubuque
 Molo Sand & Gravel Co., Dubuque

Emmet County

Cement Products Co., Estherville

Fayette County

Clermont Brick & Sand Co., Clermont
 L. S. Cooley, West Union

Floyd County

Iowa Foundry Sand Co., Floyd
 Chicago, Rock Island & Pacific Ry. Co., Marble Rock

Franklin County

U. S. Keystone Silo Co., 628 McKnight Bldg., Minneapolis, Minn.
 W. C. Nolte, Sheffield

Fremont County

Nebraska-Iowa Sand & Gravel Co., Crosby; office at Nebraska City, Nebr.

Hardin County

Chicago & North Western Ry. Co., Gifford
 Northwestern Gravel Co., Gifford
 Eldora Sand Co., Steamboat Rock; office at Eldora

Humboldt County

Humboldt Gravel & Tile Co., Humboldt

Ida County

Leonard Christenson, Ida Grove
 Concrete Stone Works, Ida Grove

Jackson County

F. H. C. Habich, Bellevue; office at Galena, Ill.
 Bellevue Sand & Gravel Co., Bellevue; office at Koss Construction Co., 5th &
 I. U. Ry. Tracks, Des Moines
 Sabula Sand & Gravel Co., Sabula
 Chicago, Milwaukee & St. Paul Ry. Co., Smiths

Johnson County

Hills Sand & Gravel Co., Hills
 City Sand Co., N. Madison St., Iowa City
 E. D. Porter, River Junction

Jones County

Chicago, Milwaukee & St. Paul Ry. Co., Monticello
 N. B. Lathrop, Oxford Mills

Kossuth County

C. J. Lenander, Bancroft

Lee County

Jos. Jaeger, Fort Madison; office at Montrose
 Keokuk Sand Co., Foot of Bank St., Keokuk

Linn County

Kings Crown Plaster Co., 98 First Ave. W., Cedar Rapids
 Larimer & Shaffer, 931 North 1st St. W., Cedar Rapids
 John Hoge, Springville
 Hadwin Williams, Springville; office at Mount Vernon
 Mrs. Rozella Corbett, Viola

Lyon County

Miller Sand & Gravel Co., Box 101, Doon
Chicago, Rock Island & Pacific Ry. Co., Granite

Mahaska County

Iowa Sand & Gravel Co., Tracey; office at Oskaloosa

Marion County

Harvey Sand & Gravel Co., Harvey

Marshall County

Empire Sand & Material Co., Marietta; office at Lock Box 467, Marshalltown
Hawkins Sand Co., 1110 N. 3rd Ave., Marshalltown

Monroe County

E. J. Erickson, Melrose

Muscatine County

Chicago, Rock Island & Pacific Ry. Co., Fruitland
Automatic Gravel Products Co., Box 34, Muscatine
The Hahn Muscatine Co., 301-302 Amer. Bank Bldg., Muscatine
Muscatine Sand & Gravel Co., Conrad Koehler, Prop., Muscatine
Northern Gravel Co., Muscatine
Pearl City Gravel Co., Ed. L. Hahn, Muscatine

O'Brien County

Paullina Construction Tile Factory, Paullina

Osceola County

Chicago, Rock Island & Pacific Ry. Co., Sibley
Sibley Cement Co., Sibley
Town of Sibley, Sibley

Palo Alto County

Chicago, Rock Island & Pacific Ry. Co., Graettinger
Graettinger Tile Works, Graettinger

Plymouth County

Big Sioux Gravel Co., Akron
Albert A. Wenzel, Pierson; office at Kingsley
J. J. Kemp, Oyens

Polk County

Chicago, Rock Island & Pacific Ry. Co., Avon and Commerce
Commerce Sand & Gravel Co., G. N. Doty, Pres., Commerce
Capital City Sand Co., Lovington; office at 308 W. Fifth St., Des Moines
Central Sand & Gravel Co., 504 Hubbell Bldg., Des Moines
Consumers Ice Co., 8th & N. Y. Ave., Des Moines
Coon River Sand Co., 308 9th St., Des Moines
The Des Moines Sand & Fuel Co., 510 Grand Ave., Des Moines
Eaton Sand Co., Des Moines
Service Sand Co., 901 S. E. 6th St., Des Moines
N. Leon Harris, R. R. No. 4, Lock Box 507, Des Moines
Independent Sand & Gravel Co., S. W. 7th & Tuttle Sts., Des Moines
Iowa Sand Co., J. C. Stevens, 20 Fulton Drive, Des Moines
Oak Park Sand Co., C. G. Cain, Sec., Des Moines
Reliance Gravel & Sand Co., Box 63, E. 28th St., C. B. & Q. tracks, Des Moines
Flint Crushed Gravel Co., Herrold; office at Des Moines
Commercial Sand Co., 513 Youngerman Bldg., Des Moines
Hawkeye Sand & Gravel Co., 906 Walnut St., Des Moines

Sac County

Chicago & North Western Ry. Co., Lake View
Northwestern Gravel Co., Lake View
Sac County, Office of Engr., Sac City

Scott County

W. G. Block Co., Box 528, Davenport
Builders Sand & Gravel Co., Nahant

Sioux County

D. A. Sorgdrager, R. D. No. 1, Alton
Alton Cement Works, Alton
S. R. Cooper, Hawarden
French & Briggs, Hawarden
C. A. Oehlerking, Hawarden

LeMars Gravel Co., Rock Valley and Hawarden

Schemmer Sand & Gravel Co., Rock Valley

Rock Valley Sand & Gravel Co., Rock Valley

Story County

Iowa State College, Ames

Story County Board of Supervisors, Ames; office at Nevada

Wapello County

Eddyville Sand & Gravel Co., Eddyville

Ottumwa Sand Co., Ottumwa

Wapello Sand & Building Material Co., 317-19 Church St., Ottumwa

Webster County

Johnston Bros., Clay Works

Chas. Larrabee, 1222 Sixth Ave., Ft. Dodge

Earl Wright, Ft. Dodge

Winneshiek County

Bernatz Bros., Decorah

Decorah Stone Products Co., R. Bucknell, Secy., Decorah

Geo. Wm. Higgins, Decorah

Wm. McNamara, Decorah

John T. Nolan, Decorah

J. H. Rosenthal, Decorah

Woodbury County

Woodbury County Gravel Plant, Correctionville

Remsen Sand & Gravel Co., Correctionville; office at Remsen

Wright County

Belmond Cement Mfg. Co., Belmond

Luick Gravel Co., Belmond

Chicago, Rock Island & Pacific Ry. Co., Belmond

Chicago Great Western R. R. Co., Belmond

STONE AND LIME.

In general the stone industry showed an improvement similar to that noted in other lines of the mineral industry. The total value of the stone and lime sold in 1923 exceeded that of the preceding year by \$55,931 although the total tonnage was less by 15,567. This increase was not shared by all parts of the stone trade, for the output of dimension stone, including building, rubble and riprap, fell short of that of the preceding year by \$71,600 and stone was used in agriculture to a less extent than during 1922, as was the case also with agricultural gypsum. The increases came in crushed stone in its various uses and here the gain was quite marked. The tonnages of the various classes of stone produced in 1922 and 1923 are shown in the following table:

Tonnages of stone and lime produced in Iowa

Uses	1922	1923
Building.....	5,560	2,910
Rubble and riprap.....	117,950	44,560
Concrete and road metal.....	417,550	449,760
Agriculture.....	59,720	50,810
Sugar factories.....	8,100	12,000
Railroad ballast and flux.....	11,830	43,510
Lime and sandstone.....	6,733	8,326
	627,443	611,876

It is evident from the table that the various industries which use crushed stone, particularly concrete and road constructions, are the ones on which the stone industry in Iowa depends very largely. In 1923 these used all but 55,796 tons of the total tonnage of 611,876. The limestone sold to sugar factories is used for refining sugar at the beet sugar factories at Mason City and Belmond.

The following table shows the value of the output of the different stone producing counties in the state so far as these may be given without revealing the business of individual producers. It also gives a summary of the business of 1922 by way of comparison with 1923. The value of the output increased in eleven counties in 1923 and decreased in ten counties. But the diminution in the ten counties amounted to only \$73,278, while the increase in the eleven counties was \$129,209. The great decreases were in Allamakee county, where extensive government work on Mississippi river used much stone in 1922 while none was used in 1923; in Des Moines county, where a large output in 1922 was followed by none in 1923; and in Dubuque county, which dropped nearly twenty thousand dollars in 1923.

Scott county is by far the largest producer, with an output for 1923 valued at \$296,968, and Black Hawk county is second in rank. Lee comes third with \$76,431 to its credit and Dubuque ranks fourth, with a production of \$69,401, which is made possible to a considerable extent by the lime burning industry. Jackson county is fifth in rank, due also very largely to the lime made at Hurstville.

MINERAL PRODUCTION IN IOWA

Production of stone and lime in 1923

County	No. of Producers	Building, rubble and riprap	Concrete and road metal	Agriculture	Other uses (a)	Total	
						Tons	Value
Allamakee(1), Appanoose(1), Black Hawk(2), Cerro Gordo(2)	6	\$ 2,781	\$ 89,328	\$ 5,255	(3)	86,325	\$115,484
Clayton(2), Clinton(1), Dubuque(4)	7	12,250	49,955	*	(2)(4)	58,530	85,466
Hardin(1), Howard(1), Jackson(1), Johnson(1)	4	-----	58,889	-----	(2)(4)	57,382	117,554
Jones	3	15,433	8,242	1,466	-----	20,773	25,141
Lee(3), Madison(1)	4	*	57,257	7,260	(1)	65,958	89,225
Linn(2), Marshall(2)	4	*	25,211	*	-----	18,069	26,025
Mitchell(1), Pocahontas(1), Scott(3)	5	11,812	242,144	*	(1)(2)(3)	304,850	316,239
Counties with less than three producers		17,458		22,016	148,309		
Production in 1922	33	59,802	531,026	35,997	148,309	611,876	775,134
Differences in 1923	34	131,402	451,943	49,226	86,632	627,443	719,203
	-1	-71,600	+79,083	-13,229	+61,677	-15,567	+55,931

* Included under Counties with less than three producers.

(a) Includes: (1) Railroad ballast, \$30,144; (2) flux, \$19,110; (3) sold to sugar factories, \$22,128; (4) lime and sandstone, \$76,927.

"Other uses" in 1922 included: Railroad ballast and flux, \$12,885; sold to sugar factories, \$11,670; lime and sandstone, \$62,047.

The output of limestone in the entire United States was 30 per cent greater in 1923 than in 1922. This increase was spread over all the important lines of the industry. The following table will show the comparative figures for the two years.

Limestone sold and used in the United States, by uses.

Use	1922		1923	
	Quantity	Value	Quantity	Value
	<i>Tons</i>		<i>Tons</i>	
Building	995,540	\$12,418,873	1,105,990	\$16,267,925
Rubble	286,340	470,264	327,180	484,771
Riprap	1,010,850	925,760	1,536,570	1,451,670
Crushed	32,786,300	33,224,879	41,386,550	42,540,754
Flux	18,690,270	14,208,457	25,562,140	20,333,939
Sugar factories	371,430	634,511	474,530	875,774
Glass factories	166,070	291,854	197,380	301,403
Paper mills	149,430	264,130	206,740	326,054
Agriculture	1,195,000	2,150,435	1,278,770	2,160,249
Other	3,317,430	3,808,764	4,625,510	4,877,468
Total sold	58,928,660	68,397,927	76,701,360	89,620,007
Portland cement	30,070,000		34,722,000	
Natural cement	148,000		212,000	
Lime	7,280,000		8,140,000	
Total used	96,426,660		119,775,360	

The amount of crushed stone used for road metal and concrete was 33,382,210 tons with an average value of \$1.08 per ton, and the amount used for railroad ballast was 8,004,340 tons with an average value of \$0.83 per ton. Iowa ranked twenty-fourth in value of limestone produced in 1923. The following list gives the Iowa operators of limestone quarries. Sandstone and lime producers are indicated in the list.

Allamakee County

U. S. Engineer's Office, Lansing; office at LaCrosse, Wis.
Wilkes Williams, R. D. No. 1, Postville

Appanoose County

Wm. B. Swan, Plano

Black Hawk County

Hawkeye Quarries Co., La Porte City; office at Cedar Rapids
A. Bartlett, 1165 E. Fourth St., Waterloo

Bremer County

Waverly Stone & Gravel Co., office at Fowler Bldg., Waterloo

Cerro Gordo County

Henry Kuppinger, Mason City
Ideal Sand & Gravel Co., Mason City
Quinby Stone Co., 24 13th St. N. E., Mason City

Clayton County

H. D. Kregel, Garnavillo, sandstone
Geo. Kohler, Guttenberg
Marquette Stone Products Co., McGregor

Clinton County

C. T. Hanrahan, Charlotte

Des Moines County

W. J. Welsh, Burlington; office at Potosi, Wis.

Dubuque County

Wm. Becker, 1333 Kaufman Ave., Dubuque
Fred W. Faldorf, 1155 Grand View Ave., Dubuque
Eagle Point Lime Works, Dubuque, also lime
Thos. R. Welsh, 202 W. Locust St., Dubuque
B. N. Arquitt, Farley

Hardin County

Hale Roberts Stone Co., Alden

Howard County

Cresco Stone & Concrete Co., Cresco

Jackson County

A. A. Hurst, Hurstville; office at Maquoketa; also lime

Johnson County

River Products Co., Coralville; office at 218 Johnson County Savings Bank Bldg., Iowa City

Jones County

The Reformatory, Anamosa
Geo. B. Shaler, Stone City
H. Dearborn's Sons, Stone City

Keokuk County

Russell B. Boyce, Sigourney

Lee County

McManus Quarries Co., Inc., Ballinger Sta.; office at Box 93, Keokuk
Keokuk Quarry & Construction Co., 1325 Main St., Keokuk
Burlington Quarry Co., Montrose; office at 17 S. Seventh St., Keokuk

Linn County

Ellis Park Stone Co., Cedar Rapids
J. E. Colton, Mount Vernon

Madison County

Peru Stone & Cement Co., Peru; office at 308 West 5th Street, Des. Moines

Marshall County

County Engineer, Marshalltown

Mitchell County

Belzer & Brenden, Osage

Osage Stone Co. (H. L. Wilson), Osage

Pocahontas County

Gilmore Portland Cement Corp., Gilmore City

Scott County

Otto Thompson, Bettendorf Stone Co., Bettendorf; office at 820 Kirkwood Blvd., Davenport

J. A. Shaw, Big Rock

Dolese Bros. Co., Buffalo; office at 337 W. Madison St., Chicago, Ill.

Linwood Cement Co., 713 Kahl Bldg., Davenport

Van Buren County

Chequest Quarries, W. H. Swank, Mgr., Keosauqua

MINERAL WATERS.

The mineral water industry shared in the general improvement of business during 1923, for the amount sold was 76 per cent larger and the value of sales was 135 per cent larger than in 1922. The sales of medicinal and table waters aggregated 45,072 gallons, with a value of \$8,907, an average price of about twenty cents per gallon. The actual prices ranged from five cents in bulk at wholesale to fifty-five cents for retail sales. The Colfax operators complained of restrictions due to high freight and express rates and special taxes. Fry's well at Colfax and the Colfax Mineral Spring also use a large amount of water for making carbonated drinks. The Grand Hotel at Colfax maintains a bathing establishment which served sixty-eight patrons during the year. The Hygeia well at Sioux City uses all its water for carbonated drinks as does also the Lime Rock Spring at Dubuque. The amount used for soft drinks at the various wells was 213,759 gallons, making a total reported use of mineral water in the state of 258,831 gallons. This does not represent nearly all the water used for soft drinks in Iowa, as there are a number of bottling establishments which do not report.

NATURAL GAS.

A small amount of gas was used in 1923. This was derived as in previous years from shallow pockets in the glacial drift. The amount reported did not exceed 100,000 cubic feet with a value of about \$172. Probably more gas is used than these figures would indicate, for since these gas pockets are usually found during well drilling operations their presence is not always reported to this department and no record is made of their use.

MINERAL PRODUCTION IN IOWA IN 1924*

Products	Unit	Quantity	Value
Cement	Bbl. of 376 lb.	4,881,613	\$ 8,811,587
Clay products			5,692,147
Coal	Short ton	5,468,450	18,097,000
Gypsum	short ton	640,953	5,657,339
<i>Mineral waters</i>	<i>no census</i>		
Natural gas	M. cu. ft.	575	300
Sand and gravel	short ton	2,427,626	1,473,066
Stone and lime	short ton	610,408	739,632
			\$40,470,971

* Figures compiled by the Iowa Geological Survey in cooperation with the United States Geological Survey and the Bureau of the Census. Acknowledgment is made of the use of tables and other data published by these organizations.

The mineral industry in 1924 did not bring to fulfilment the prophecy which the upward trend of 1923 seemed to show. In contrast with the output of mineral products during 1923, valued at \$46,237,521, which had increased from \$36,189,398 in 1922, the output in 1924 declined to \$40,470,971, a drop of \$5,766,550. This decline was shared by all lines of production except that of gypsum, which enjoyed an increase in nearly every branch of the industry. The decrease in other products would seem to be the result of diminished activity in the building trades as well as unfavorable agricultural conditions. Similar conditions seem likely to persist in 1925 and may perhaps be accentuated during that year. Production in the United States fell from \$5,998,800,000 in 1923 to \$5,318,000,000 in 1924, a drop of 11 per cent, a fact which indicates that Iowa was not alone in the experience of general depression. The following table will be of interest in showing the amount and increase of mineral production in the country as a whole.

Mineral production in the United States

Year	Value	Percentage of increase or decrease
1880-1913	\$35,295,900,000	-----
1914	2,111,172,000	-13
1915	2,394,644,000	+18
1916	3,508,439,000	+47
1917	4,992,496,000	+42
1918	5,540,708,000	+11
1919	4,595,770,000	-17
1920	6,981,340,000	+52
1921	4,138,500,000	-41
1922	4,647,290,000	+12
1923	5,998,800,000	+29
1924	5,318,000,000	-11
Total	85,523,059,000	

To this total metallic minerals contributed \$29,636,510,000, non-metallic minerals \$55,787,402,000 and unclassified minerals \$99,147,000. Iowa occupied twenty-fourth place among the states of the Union in value of mineral produced in 1923.

CEMENT

Sales of Portland cement manufactured in Iowa declined from a total value of \$10,351,971 in 1923 to that of \$8,811,587 in 1924, a drop of \$1,540,384 or nearly 15 per cent. However, the 1924 output still exceeded in value those of 1921 and 1922 and even that of 1920, which latter, valued at \$8,742,854, had been the peak production up to 1923, so that perhaps the figures for 1924 should be compared with those for the years immediately preceding 1923, rather than with the latter year. The following table will show the state of the industry during 1922 to 1924.

Production of Cement in Iowa, 1922 to 1924

	1922	1923	1924
Production, bbls.	4,272,432	5,732,470	5,624,466
Stock, Dec. 31, bbls.	790,447	952,242	1,695,093
Shipments, bbls.	4,475,074	5,570,675	4,881,613
Shipments, value	\$7,709,313	\$10,351,971	\$8,811,587
Average factory price per bbl.	\$1.72	\$1.86	\$1.81
Consumption, bbls.	3,242,436	3,624,857	
Population, est.	2,459,411	2,477,874	
Consumption per capita, bbl.	1.32	1.46	
Surplus production	1,228,638	1,945,818	
Coal used during year, tons		589,117	
Annual finished cement capacity of plants, bbls.	5,650,000	6,875,000	6,685,000
Daily clinker capacity, bbls.			20,300

In the United States as a whole both production and shipments were larger in 1924 than in 1923 and the number of active factories increased from 126 in 1923 to 132 in 1924. The commercial district which includes eastern Missouri, Iowa, Minnesota and South Dakota produced in 1924, 14,851,000 barrels and shipped 13,982,000 barrels, valued at \$19,224,000. Wisconsin and South Dakota each began production of cement in 1924. The following table giving statistics for 1924 may be compared with a similar table for 1923. Note that Iowa ranks eighth in production and ninth in shipments. Alabama came up from eleventh place in shipments in 1923 to a rank above Iowa in 1924.

Portland cement in the United States, 1924

State	Plants	Production		Shipments	
		bbls.	bbls.	bbls.	value
Pennsylvania	22	40,468,000	39,847,000		\$69,993,000
California	10	11,615,000	11,502,000		25,649,000
Michigan	15	9,162,000	8,993,000		16,367,000
Missouri	5	7,900,000	7,710,000		13,801,000
New York	9	7,547,000	7,450,000		13,708,000
Illinois	4	7,005,000	6,956,000		12,243,000
Kansas	7	5,894,000	5,817,000		10,122,000
Alabama	5	5,541,000	5,543,000		9,091,000
Iowa	5	5,624,466	4,881,613		8,811,587
Texas	5	4,566,000	4,488,000		8,482,000
Ohio	7	4,599,000	4,298,000		7,865,000
Washington	4	1,845,000	1,793,000		4,339,000
Other states	34	37,093,000	36,468,000		66,670,000
	132	137,460,238	145,747,000		267,319,000

CLAY PRODUCTS.

The value of the clay wares produced in Iowa during 1924 fell \$1,263,962 below the figure of \$6,956,109 which represented the value of the production of 1923. This decrease affected nearly every branch of the industry and was the combined result of a diminution in output and lower prices per unit. The following table will give a summary of the industry in 1923 and 1924.

Production of clay wares by classes in 1923 and 1924

Class	Plants		Quantity		Value		Av. unit value	
	1923	1924	1923	1924	1923	1924	1923	1924
Common brick	52	51	72,558	62,070	\$ 921,853	\$ 737,898	\$12.71	\$11.88
Vitrified brick		4	31,523	6,507	513,684	129,314		19.87
Face brick	22	19	29,346	23,785	590,191	451,136	20.11	18.96
			<i>tons</i>	<i>tons</i>				
Hollow bld. tile (a)	44	37	297,253	243,712	2,197,515	1,740,296	7.39	7.14
Hollow bld. tile (b)	8	16	26,073	53,412	195,006	446,246	7.48	8.35
Drain tile	54	54	173,678	147,499	1,508,836	1,266,586	8.69	8.58
Sewer pipe	5	5	54,828	52,998	805,676	793,840	15.79	14.98
Other products (c)						154,379		
	64	69				5,692,147		

(a) Includes partition, load-bearing, furring, book tile.

(b) Includes floor-arch, silo and corner brick tile; conduits; radial chimney blocks.

(c) Includes products not elsewhere specified, raw clay sold, pottery. Value of raw clay not included in state total.

A comparison of the figures given in this table with those for 1923 leads to the conclusion that there must have been a decided

slowing down in building operations and in other civic improvements wherein clay products are used, as well as in land improvement represented by drainage and similar work. Insofar as construction of extensive drainage systems is concerned this let-down may be a distinct benefit.

The production of clay wares by counties is shown in as much detail as possible in the table given below.

Production of Clay Wares in Iowa in 1924

County	No. Producers	Common brick		Hollow building tile or block		Drain tile		Other products (a)	Total value
		thous.	value	tons	value	tons	value	value	
Allamakee (1), Appanoose (1), Audubon (2)	4	1,526	\$ 17,103	2,642	\$ 15,742	1,607	\$ 9,663		\$ 42,508
Benton (1), Boone (1), Buena Vista (1), Cass (1), Cedar (1)	5	2,829	35,550		(b)	1,492	13,168	\$50,419(2)(3)(4)	99,137
Cerro Gordo	3	3,130	46,022	144,181	1,100,189	40,805	328,028	*	1,487,179
Dallas	3	1,325	19,861	29,295	197,413	11,923	88,444	*(2)(3)	363,545
Dubuque (1), Fayette (1), Floyd (1), Franklin (1)	4	4,354	58,212	11,925	76,175	19,968	164,475	34,113(3)	332,975
Grundy (1), Guthrie (1), Hamilton (1), Hardin (2), Henry (2)	7	289	3,776	1,531	14,221	16,590	191,195	56,911(3)(6)(7)	266,103
Howard (1), Jackson (1), Jasper (2)	4		(b)		(b)	1,201	9,779	26,195(1)(4)(7)	35,974
Johnson (2), Jones (2)	4	591	8,913			2,338	19,300		27,213
Keokuk(3), Mahaska(2)	5	2,838	31,285		(b)	8,222	72,076	188,137(3)(4)(6)(7)	291,498
Marion (1), Marshall (1), Poweshiek (2)	4	342	3,051	3,270	20,684	2,597	18,433		42,168
Polk	6		(b)	24,057	164,025	6,289	65,390	594,760(1)(2)(3)(6)(7)	824,175
Story (2), Tama (3)	5	1,193	16,846	2,023	8,553	1,339	8,618	15,945(3)(7)	49,962
Union (1), Wapello (1), Warren (1)	3	6,081	65,683	32,404	209,531	7,177	48,226	*	341,299
Washington (4), Woodbury (2), Wright (1)	7	26,960	289,808	6,064	44,273	1,989	16,096	*	459,923
Webster	8	3,676	45,487	33,261	299,152	23,962	213,695	496,801(3)(6)(7)	1,055,135
Counties or groups of counties having less than three producers								198,705	
Totals	72	62,070	\$737,898	297,124	\$2,186,542	147,499	\$1,266,586	\$1,501,122	\$5,692,147

* Included with counties having less than three producers.
(a) Includes: (1) common brick from Howard, Johnson, Jasper and Polk counties; (2) vitrified brick, 6,507,000, valued at \$129,314, from Boone, Dallas and Polk counties; (3) face brick, 23,785,000, value \$451,186, including 1,580,000, valued at \$32,873, from Webster county; (4) hollow building tile or block from Benton, Cass, Howard, Jasper, Jones, Keokuk and Mahaska counties; (6) sewer pipe, 52,998 tons, value \$793,840, from Hamilton, Keokuk, Polk and Webster counties; (7) miscellaneous products, such as wall coping, flue lining, pottery, raw clay. The value of the latter is included in county totals but is excluded from state totals.
(b) Included in other products.

Production was reported from thirty-nine counties in the state. Cerro Gordo was the leading county, although this county has only three producers. Over a million dollars' worth of hollow building tile was made in this county, fully one-half the product of the entire state. It is interesting to note the change in the production of clay ware in Cerro Gordo county during the past ten years. The data for 1914 show that the output, valued at \$1,555,944, was distributed—\$39,976 for common brick, \$990,993 for drain tile, and \$525,035 for other products, including hollow tile and minor items. The total output of the county has not changed greatly but the emphasis has shifted decidedly. This shift is quite marked as regards the whole state. Until 1920 drain tile was much the most important item in the clay industry, but since that year it has declined steadily in value. On the other hand hollow building ware has been gaining in importance until its value exceeds that of drain tile although it has never been as high as was that of drain tile during its peak years.

The next county in importance is Webster, whose output is distributed chiefly among hollow ware, drain tile and, especially, sewer pipe, in which it is by far the leading county. Other important counties in order are Polk, Woodbury and Dallas.

Iowa ranks twenty-fourth in value of common brick, ninth in value of vitrified brick, seventeenth in value of face brick, third in value of hollow ware, second in value of drain tile, eighth in value of sewer pipe and tenth in value of unspecified products. All products exclusive of pottery made in the United States reached a total value of \$299,583,393. This represented a decrease of 4.2 per cent as compared with 1923. Pottery products made in 1924 were valued at \$118,014,985, an increase of 2.7 per cent over 1923.

COAL

The production of coal from Iowa mines in 1924 reached a total tonnage of 5,468,450. This showed some decline from the output of 5,710,735 tons in 1923 but still was ahead of the output during 1922, which was only 4,335,161 tons, the smallest output, by the way, since 1896. The tonnages recovered during the present decade have failed for the most part to equal those of the two preceding decades, since Iowa's output first reached the five mil-

lion ton mark in 1899. A tabulation of the figures will help to show the stages through which the industry has passed during those years.

Production of coal in Iowa, 1900 to 1924

Year	tons	value	year	tons	value
1899	5,177,479	\$6,397,338	1912	7,289,529	\$13,152,088
1900	5,202,939	7,155,341	1913	7,525,936	13,496,710
1901	5,617,499	7,822,805	1914	7,451,022	13,364,070
1902	5,904,766	8,660,287	1915	7,614,143	13,577,608
1903	6,419,811	10,563,910	1916	7,260,800	13,530,383
1904	6,519,933	10,504,406	1917	8,965,830	21,096,408
1905	6,798,609	10,586,381	1918	8,192,195	24,703,237
1906	7,266,224	11,619,455	1919	5,624,692	17,352,620
1907	7,574,322	12,258,012	1920	7,813,916	30,793,847
1908	7,149,517	11,706,402	1921	4,531,392	17,256,800
1909	7,757,762	12,793,628	1922	4,335,161	16,119,000
1910	7,928,120	13,903,913	1923	5,710,735	20,517,000
1911	7,331,648	12,663,507	1924	5,468,450	18,097,000

The table shows not only the decline in recent years but also the fluctuation in production and the abrupt rise in unit value achieved during the war period and maintained to some extent ever since. A table giving the tonnage produced each year from 1840 to 1918 is given in the report of mineral production in volume XXVIII of these reports.

A table giving details of production in 1924 which follows shows that Monroe county maintained her usual lead, owing to the fact that the mines of the county though few in number, seventeen in 1924, are for the most part large and are prepared to produce large tonnages. Polk county, with twenty-three mines, came up to second place in both tonnage and value, a place which has been held for several years by Appanoose, which in 1924 took third rank, with seventy-one mines.

The thin Nodaway seam, which is utilized by nine mines in Adams, Page and Taylor counties, yielded in 1924, 40,097 tons, valued at \$179,000. Iowa stood twelfth in tonnage in 1923 among

Production of coal by counties in 1924

Counties	No. Producers	Loaded at mines for shipment tons	Sold to local trade and used by employees tons	Used at mine for steam and heat tons	Total		Average value per ton.	Number of Employees			Average number of days worked
					tons	value		Under-ground	Surface	Total	
Adams	5	-----	7,799	-----	7,799	\$ 33,000	\$4.19	36	5	41	171
Appanoose	61	711,641	88,128	14,031	813,800	2,860,000	3.52	2,891	240	3,131	134
Boone	9	227,799	63,727	3,568	295,094	1,189,000	4.03	679	49	728	176
Dallas	5	516,011	14,534	4,306	534,851	1,772,000	3.31	868	87	955	196
Greene	3	-----	3,156	-----	3,156	16,000	5.07	18	3	21	114
Davis(1) Jefferson(2)	3	-----	3,433	-----	3,433	11,000	3.84, 3.15	15	3	18	100, 154
Guthrie	5	-----	5,148	-----	5,148	25,000	4.86	28	3	31	137
Jasper	9	with "Local"	102,956	6,682	109,638	377,000	3.44	192	34	226	154
Keokuk	6	-----	9,673	562	10,235	32,000	3.13	23	7	30	126
Lucas	4	618,073	2,538	20,161	640,772	1,886,000	2.94	653	73	726	189
Mahaska	30	with "Local"	56,937	513	57,450	175,000	3.05	177	35	212	105
Marion	21	767,102	744,150	24,389	835,641	2,525,000	3.02	1,145	114	1,259	195
Monroe	12	992,828	63,544	29,511	1,085,883	3,549,000	3.27	2,237	152	2,389	151
Page(2), Taylor(2)	4	with "Local"	-32,298	with "Local"	32,298	146,000	4.41, 4.72	72	9	81	218, 200
Polk	19	400,538	478,612	13,932	893,082	3,028,000	3.39	1,614	174	1,788	176
Story(1), Warren(2) Webster(1)	4	with "Local"	28,096	3,800	31,896	97,000	4.12, 2.80, 4.03	99	15	114	240, 129, 200
Van Buren	6	with "Local"	8,645	with "Local"	8,645	27,000	3.12	23	5	28	142
Wapello	26	with "Local"	71,197	1,213	72,410	255,000	3.52	181	27	208	154
Wayne	4	with "Local"	27,219	with "Local"	27,219	94,000	3.44	108	9	117	128
	236	4,351,252	993,393	123,805	5,468,450	18,097,000	3.31	11,059	1,042	12,101	161

the coal producing states and eleventh in value. Estimates show that she held eleventh place in tonnage in 1924. The following figures give final data for 1923, including returns for wagon mines, and estimates for tonnage of 1924.

Coal produced in the United States in 1923 and 1924

State	1923		1924	
	tons	value	tons	value
Pennsylvania	171,879,913	\$472,217,000	123,530,000	
West Virginia	107,899,941	285,481,000	110,000,000	
Illinois	79,310,075	198,388,000	67,880,000	
Kentucky	44,777,317	113,542,000	45,000,000	
Ohio	40,546,443	98,610,000	29,200,000	
Indiana	26,229,099	65,046,000	22,340,000	
Alabama	20,457,649	51,624,000	19,490,000	
Virginia	11,761,643	32,468,000	10,900,000	
Colorado	10,346,218	33,299,000	9,840,000	
Wyoming	7,575,031	20,916,000	6,850,000	
Tennessee	6,040,268	16,575,000	4,800,000	
Iowa	5,710,735	20,517,000	5,468,450	18,097,000
Total bituminous	564,156,917	1,513,327,000	483,280,000	
Penn. anthracite	93,339,009	506,786,768	90,214,000	
Total U. S.	657,495,926	2,020,114,000	573,494,000	

GYPSUM

Production in the gypsum industry exceeded the high record made in 1923, thus setting a new mark in crude gypsum mined, in the amount sold crude, in the amount and value of plaster sold, in amount and value of wall and plaster board sold and in total amount and value of sales. Perhaps the most remarkable feature of this record is the fact that it was made while every other branch of the mineral industry in Iowa was experiencing a reverse. The table given below shows the details of the industry during the past two years.

Production of gypsum in 1923 and 1924

	1923		1924	
	tons	value	tons	value
Crude gypsum mined	685,041		727,385	
Sold crude—to cement mills	134,566	\$ 383,322	149,972	\$ 371,331
agriculture and others	329	1,961	1,236	8,098
Total sold crude	134,895	385,283	151,208	379,429
Sold calcined—as stucco	17,681	120,130	68,280	459,044
as other wall plaster	315,435	2,505,183	314,751	2,462,304
as plaster of Paris, molding, casting plaster	1,937	21,366	5,503	55,626
as Keene's cement, dental plaster, plate glass works	6,085	97,677	3,660	31,770
as plaster board and wall board	44,183	1,583,681	55,486	1,719,322
as tile and block and for other purposes	46,508	665,212	42,065	549,844
Total sold calcined	431,829	4,983,249	489,745	5,277,910
Total sold	566,724	5,368,532	640,953	5,657,339

Most of the plaster grouped under the head of Keenes cement, etc., is sold to plate glass works for bedding glass in molding. Likewise much the greater part of the plaster sold in board form is made into wall board, which is the finished form, ready for tinting or other details to make a complete wall. Most of the plaster used in making tile and block goes into partition tile, the value of which in 1924 was \$339,000. The rest was roof tile and special forms. Nearly a hundred thousand dollars worth of plaster was sold for miscellaneous uses in 1924. The same plants were in operation during 1924 as during previous years. The Acme Cement Plaster Company of Centerville and the Hawkeye Gypsum Products Company of Fort Dodge are listed as "not yet in operation".

The amount of crude gypsum produced in the United States in 1924 was 5,042,629 tons and the value of crude and calcined gypsum sold was \$42,724,507.

STONE AND LIME

There was a slight decline in the production of limestone and lime in 1924, in both tonnage and value. The chief reduction was in the output of crushed stone for concrete and road work and in

the manufacture of lime, while some branches of the industry showed an increase. The total value of the output was \$739,632 as compared with \$775,134 in 1923, a decline of \$35,502. As in previous years much the greater part of the stone quarried in Iowa is crushed for various uses, as detailed in the tables below. Less than fifty thousand tons is used as dimension stone while the remainder is used in smaller form. The distribution of stone among its various uses is shown in the summary given herewith.

Tonnages of stone and lime produced in Iowa

Uses	1922	1923	1924
Building	5,560	2,910	3,290
Rubble and riprap	117,950	44,560	46,530
Concrete and road work	417,550	449,760	434,460
Agriculture	59,720	50,810	57,520
Sugar factories	8,100	12,000	14,050
Railroad ballast and flux	11,830	43,510	49,640
Lime, sandstone, other	6,733	8,326	4,918
	627,443	611,876	610,408

Scott county continued to be the leader in production, with Dubuque as second and Black Hawk as third in rank. Hardin and Johnson, with one producer each, are among the important counties of the state, and Lee holds a place next to that of Black Hawk. The latter county produces over eighty thousand dollars' worth of stone annually while Lee's output is worth about sixty thousand dollars.

The following table gives in as much detail as possible the production of stone in 1924.

Limestone and lime production in 1924

Counties	Pro- ducers	Building, rubble, riprap (a)		Concrete, road metal		Agriculture		Other uses (b)		Total	
		tons	value	tons	value	tons	value	tons	value	tons	value
Allamakee(1), Black Hawk(2), Clayton(2)	5	4,634	\$ 8,612	64,100	\$ 83,103	6,210	\$ 4,202	.....	.....	74,944	\$ 95,917
Cerro Gordo(2), Mitchell(2), Pocahontas (1)	5	with "Other uses"		37,670	44,112	with "Other uses"		14,550	\$24,289	52,220	68,401
Clinton(1), Linn(1), Johnson(1), Jackson(1)	4	with "Other uses"		40,105	53,932	6,194	13,906	3,100	4,540	49,399	72,378
Dubuque	6	9,683	11,502	56,910	90,320	with "Concrete"		4,164	20,436	70,757	122,258
Jones	3	15,308	16,944	5,831	5,897	with "Concrete"		.....	.....	21,139	22,841
Henry(1), Lee(3)	4	with "Other uses"		33,093	52,763	3,821	3,617	9,960	12,739	46,874	69,119
Hardin(1), Madison(1), Marshall(1)	3	.....	.....	65,844	71,922	15,211	9,717	with "Concrete"		81,055	81,639
Scott	3	10,464	13,752	142,479	140,063	with "Other uses"		61,074	53,264	214,017	207,079
Totals	33	49,820	63,938	434,460	533,500	57,520	43,169	68,608	99,025	610,408	739,632

(a) Includes: Building, 3,290 tons, value \$8,281; rubble and rippap, 46,530 tons, value \$55,657.

(b) Includes: R. R. ballast, 38940 tons, value \$33,415; flux, 10,700 tons, value \$12,480; sugar factories, 14,050 tons, value \$23,589; lime and miscellaneous, 4,918 tons, value \$29,541.

Lime was burned at Dubuque and at Hurstville, near Maquoketa, as in former years. The value of the product is included in the figures for Dubuque and Jackson counties.

SAND AND GRAVEL

The production of sand and gravel suffered a rather serious decline in 1924 as compared with conditions in the previous year. This condition prevailed in every branch of the industry, in both sand and gravel production. It was in marked contrast with the rise in production which had occurred in 1923, a rise which brought the value from \$1,752,233 in 1922 to \$2,181,881 in 1923. The decline to \$1,473,066 in 1924 doubtless is to be attributed to a falling off in building and road improvement. The table given herewith shows some phases of the industry not set forth in the table of production by counties.

Summary of sand and gravel production

Kind of material	1923		1924	
	tons	value	tons	value
Sand:				
Molding	35,654	\$ 40,238	22,397	\$ 24,209
Building	1,004,261	512,413	653,031	317,068
Paving	670,181	310,750	575,835	234,966
Cutting and grinding	17,225	36,288	with	filter sand
Engine	61,680	37,627	47,607	24,661
Filter	11,968	7,505	15,681	32,922
Other	31,364	20,435	10,879	3,954
Total sand	1,832,333	965,276	1,325,430	637,780
Gravel:				
Building	343,078	331,045	311,558	289,584
Paving	837,558	634,020	563,776	483,003
Railroad	584,191	251,540	226,862	62,699
Total gravel	1,764,827	1,216,605	1,102,196	835,286
Total production	3,597,160	2,181,881	2,427,626	1,473,066

Sand and gravel were produced in forty-three counties in 1924, and the leading counties in order of value were Polk, Muscatine, Cerro Gordo, Cherokee, Sac, Linn, Hardin, Boone, Black Hawk and Wapello. As several of these counties had less than three producers each their production can not be revealed in detail. These ten counties, however, produced in 1924 material valued at

\$1,141,900, much the largest part of the state's output. It may be noted that several of these counties—namely Cerro Gordo, Cherokee, Polk, Sac, Hardin and Boone — are in the central part of the state, in the area covered by what is known as the Wisconsin glacial drift. This drift sheet contains great amounts of sand and gravel, both incorporated in the body of the drift and as masses of nearly clean sand or gravel. These latter are all ready for the shovel of the excavator, as in Cherokee, Cerro Gordo and Sac counties, and the former yields its store to the streams, from which it may be readily dredged, as is the case in Polk county. The other important counties are located on large streams—the Mississippi, the Cedar and the Des Moines—which have gathered their stores from the glacial drift across which they flow.

The following table shows the production in 1924 by counties and a summary of production in 1923.

Production of sand and gravel in 1924

County	Operators	Building sand		Paving sand		Other sand (a)		Gravel		Total	
		tons	value	tons	value	tons	value	tons	value	tons	value
Black Hawk(2), Bremer(1), Fayette(1)	4	28,979	\$ 15,221	40,000	\$ 20,000	(3) with	"Paving"	26,600	\$ 25,400	95,579	60,621
Boone(2), Story(2)	4	15,419	8,017	with	"Building"	-----	-----	68,846	41,222	84,299	49,256
Butler(2), Franklin(1), Wright(2)	5	1,640	840	-----	-----	-----	-----	37,259	10,496	38,899	11,336
Cerro Gordo(2), Emmet(1), Kossuth(1)	4	47,072	25,243	15,000	8,000	(3) with	"Paving"	57,786	87,250	119,858	120,493
Cherokee(4), Clay(1)	5	43,381	15,238	28,415	9,126	-----	-----	102,232	62,268	174,028	86,632
Clayton(2) Winneshiek(3)	5	4,272	8,200	-----	-----	20,364	20,364(1)	424	163	25,060	28,727
Clinton(3), Lee(1), Scott(3)	7	85,610	35,646	with	"Building"	-----	-----	35,951	28,236	121,561	63,882
Dickinson(1), Osceola(2), O'Brien(2)	5	2,168	1,767	-----	-----	(3) with	"Building"	10,080	1,521	12,243	3,288
Dubuque(2), Jackson(2), Jones(1)	5	27,056	7,115	16,527	6,179	(3) with	"Paving"	57,170	32,715	100,753	46,009
Fremont(1), Humboldt(1), Webster(2)	4	50,440	21,437	17,913	9,115	(5) with	"Paving"	20,773	25,844	89,126	56,396
Hardin(3), Marshall(1)	4	with	"Paving"	20,594	7,067	(5) with	"Paving"	88,107	42,494	108,691	49,561
Ida(1), Sac(3)	4	22,168	10,730	with	"Building"	-----	-----	86,764	48,953	108,952	59,683
Johnson(2), Linn(5)	7	57,606	33,470	54,255	28,873	-----	-----	4,631	3,340	114,492	65,683
Lyon(2), Sioux(6)	8	25,283	14,050	12,692	5,069	-----	-----	15,039	6,221	53,014	25,340
Mahaska(1), Marion(1), Wapello(2)	4	38,724	16,533	66,516	29,021	(1)(5) with	"Paving"	18,037	21,364	123,277	66,918
Muscatine	5	53,006	32,418	90,382	18,406	32,889	47,553(2)(3)(4)(5)	162,476	141,026	338,753	239,403
Palo Alto(1), Plymouth(2), Woodbury(1)	4	29,056	11,726	-----	-----	(5) with	"Building"	105,565	20,913	134,821	32,639
Polk	11	138,846	66,533	226,187	99,182	14,896	5,620(3)	204,481	235,567	584,410	406,902
Totals	95	653,031	317,068	575,835	234,966	96,564	85,746(a)	1,102,196	835,286	2,427,626	1,473,066
Totals for 1923		1,004,261	\$512,413	670,181	\$310,750	157,891	\$142,113	1,764,827	\$1,216,605	3,597,160	\$2,181,881

SAND AND GRAVEL BY COUNTIES

(a) Includes: (1) molding sand, 22,397 tons, value \$24,209; (2), (4) grinding sand, filter sand, 15,681 tons, value \$32,922; (3) engine sand, 47,607 tons, value \$24,661; (5) other sands, 10,879 tons, value \$3,954.

NATURAL GAS

The output of natural gas continued in 1924 in a small way, as in previous years. The amount consumed amounted to about 575,000 cubic feet, with a value at points of consumption of \$300. The producing wells are located near Herndon in Guthrie county and near Letts in Louisa county.

Some wells were being drilled for oil but no commercial quantities had been found during the year.

MINERAL WATERS

Owing to lack of funds the collection of data regarding use of mineral waters has been discontinued.