
MINERAL PRODUCTION OF IOWA

IN 1902

BY

S. W. BEYER.

VALUE OF MINERAL PRODUCTION.

1901.

Coal	\$ 8,051,806
Clay	2,774,200
Stone	794,278
Gypsum	562,500
Lead and zinc	16,500
Iron ore	4,876
Total	\$12,204,160

1902.

Coal	\$ 8,058,779
Clay	2,843,591
Stone	673,361
Gypsum	337,735
Lead	11,178
Iron ore	
Total	\$11,924,644

MINERAL PRODUCTION IN IOWA FOR 1902.

BY S. W. BEYER.

Iowa practically held her own in mineral production for 1902 as compared with 1901 notwithstanding the unusual amount of inclement weather. Clay and coal show slight increases in values but falling off in quantity produced. Stone, more sensitive to weather conditions, shows a marked shrinkage both in value and quantity marketed. The production of lead has not been affected materially, the value showing a small loss. The production of gypsum shows but little change. Iowa's one iron mine was not a producer during 1902. The number of producers reporting shows an increase of six per cent over the preceding year owing largely

to the ferreting out of the country coal banks and small quarries by the special agents of the Census Bureau.

The number of producers for the various mineral industries of the state are shown below in parallel columns for the years 1900 to 1902 inclusive.

	1900.	1901.	1902.
Coal.....	231	242	274
Clay	381	349	329
Stone.....	170	229	273
Gypsum.....	7	7	7
Lead and zinc.....	6	10	8
Iron.....	1	1	1
	796	838	892
Total.....			

The statistics for clay were gathered as usual through the co-operation of Federal and State Geological Surveys. The statistics for the other mineral products were secured through the Federal Census Bureau acting with the Division of Mining and Mineral Resources of the United States Geological Survey.

As during preceding years the producers have shown a commendable promptness in filling out and returning schedules sent them and it is a pleasure to accord them full acknowledgment for the service rendered the Survey.

The value of the total mineral production in Iowa for 1902 is shown in Table I.

MINERAL PRODUCTION BY COUNTIES.

TABLE No. I.

VALUE OF TOTAL MINERAL PRODUCTION BY COUNTIES FOR 1902.

COUNTIES.	Number of producers.	Total coal.	Total clay.	Total stone	Miscellaneous.	Total.
Adair	4		12,210			12,210
Adams	21	42,193	26,652	2,159		70,995
Allamakee	4			7,429		7,429
Appanoose	53	1,284,253	15,950	222		1,300,425
Audubon	1		12,300			12,300
Benton	14		22,423	5,884		28,307
Black Hawk	14		15,104	11,415		26,519
Boone	21	509,624	53,987			563,611
Bremer	2		1,252			1,252
Buena Vista	3		22,000			22,000
Buchanan	1		280			280
Butler	1		1,966			1,966
Calhoun	3		14,500			14,500
Carroll	1		8,400			8,400
Cass	5		12,405			12,405
Cedar	4		8,318	69,034		77,352
Cerro Gordo	12		211,420	34,914		246,334
Cherokee	1		8,800			8,800
Chickasaw	1		600			600
Clarke	8		2,800	1,435		4,235
Clayton	10		7,608	7,030		14,638
Clinton	16		27,850	16,377		44,227
Crawford	2		11,820			11,820
Dallas	14	37,557	89,102	68		126,727
Davis	10	16,573	2,775			19,348
Decatur	9		5,375	1,756		7,131
Delaware	6		6,800	2,675		9,475
Des Moines	17		24,264	31,833		56,097
Dubuque	25		29,400	54,269	11,178	94,847
Emmet	1		750			750
Fayette	11		14,710	5,513		20,223
Floyd	11		2,983	6,693		9,676
Fremont	5		14,528			14,528
Franklin	1		587			587
Greene	7	15,345	25,000			40,345
Grundy	1		1,400			1,400
Guthrie	7	4,875	34,630			39,505
Hamilton	4		67,800	2,873		70,673
Hancock	1		2,350			2,350
Hardin	12		62,694	10,605		73,299
Harrison	7		22,345			22,345
Henry	6		14,060	2,109		16,169
Howard	6		7,500	2,224		9,724
Humboldt	3		11,000	1,849		12,849
Ida	1		4,739			4,739
Iowa	5		26,815			26,815
Jackson	7			70,011		70,011
Jasper	25	334,963	31,500			366,463
Jefferson	8	19,678	17,698			37,376
Johnson	9		37,275	5,500		42,775
Jones	15		7,876	90,716		98,592

MINERAL PRODUCTION OF IOWA.

TABLE No. I—CONTINUED.

VALUE OF TOTAL MINERAL PRODUCTION BY COUNTIES FOR 1902.

COUNTIES.	Number of producers.	Total coal.	Total clay.	Total stone.	Miscellaneous.	Total.
Keokuk.....	33	251,769	31,450	2,700		285,919
Kossuth.....	1		960			960
Lee.....	21		9,125	24,139		33,264
Linn.....	15		38,475	17,735		56,210
Louisa.....	11		7,400	4,205		11,605
Lucas.....	4	318,993	3,000			321,993
Madison.....	11		6,000	24,728		30,728
Mahaska.....	28	732,686	65,775	285		798,746
Marion.....	34	290,797	19,636	3,515		313,948
Marshall.....	10		33,111	58,096		91,209
Mills.....	4		14,500			14,500
Mitchell.....	6			3,545		3,545
Monona.....						
Monroe.....	15	1,736,432	8,365	504		1,745,301
Montgomery.....	9		40,540	5,105		45,645
Muscatine.....	10		37,408			37,408
Page.....	10	25,677	28,600			54,277
Plymouth.....	1		3,500			3,500
Pocahontas.....	2		33,420			33,420
Polk.....	38	1,507,431	40,412			1,997,843
Pottawattamie.....	8		82,488			82,488
Poweshiek.....	3		14,400			14,400
Ringgold.....	2		10,500			10,500
Sac.....	1		1,050			1,050
Scott.....	28	20,258	42,988	49,099		112,345
Shelby.....	2		12,890			12,890
Sioux.....	2		14,800			14,800
Story.....	5	732	26,147			26,879
Tama.....	12		54,470	267		54,737
Taylor.....	7	29,186	10,421			39,607
Union.....	2		20,300			20,300
Van Buren.....	15	24,499	8,360	889		33,748
Wapello.....	27	460,056	73,833	23,910		557,799
Warren.....	8	38,288				38,288
Washington.....	9		22,600	4,885		27,485
Wayne.....	10	109,794	10,120			119,914
Webster.....	38	256,870	250,403	5,024	337,735	850,032
Winneshiek.....	3		4,700	65		4,765
Woodbury.....	6		233,543			233,543
Wright.....	4		13,300			13,300
Total.....	891	\$3,058,779	\$2,843,591	\$673,361	\$348,913	\$ 11,924,644

COAL.

The price of coal ruled firm through the year with a sharp rise near the end of the year owing to the great strike in the anthracite fields of Pennsylvania. Notwithstanding high prices

and the apparent scarcity in fuels the returns show an actual falling off in production amounting to approximately 50,000 tons. The shortage is due to the abandonment of mines, formerly large producers, in Mahaska and Keokuk counties. Mahaska for many years the ranking coal producing county in the state fell to third place in 1901 and dropped to a poor fourth in 1902. Keokuk ranked fifth in 1901 and tenth in 1902. The increase in price stimulated the small mines as seen in the increased number producing and the increased outputs for the counties of small productions. Appanoose is the only other large producer showing a decrease. High prices have stimulated development work. Much prospecting has been done in many of the counties while important plants are being installed in Monroe, Marion, Polk, Boone and Webster counties which promise to materially increase the output for 1903.

Table II gives the total tonnage, average price per ton, total value, number of mines producing, average number of days worked and number of men employed, arranged by counties. An attempt has been made to collect statistics as to distribution which has not been done before. It is believed that the results are fairly reliable for coal shipped and coal sold locally, but little dependence can be placed on the amount used at the mines as but few companies returned a report. No data are at hand to determine the amounts of the various sizes of coal put upon the market. Mine run, steam coal, nut, pea and slack are included in the total. The average price per ton is, in reality, on a mine run basis, and must not be confused with the average price for lump coal which runs considerably higher in the counties which "shoot from the solid" and approximately the same where "long wall" is the system employed. The great difference in the average prices per ton in Marion and Monroe counties when compared with Boone may be more readily understood when it is known that the two former shoot from the solid and the latter mines long wall.

TABLE No. II.
COAL PRODUCTION BY COUNTIES FOR 1902.

COUNTIES.	Number of producers.	Tons shipped.	Tons sold locally.	Tons used at the mine.	Total tons produced.	Total value.	Average price per ton.	Average number of men employed.	Average number of days worked.
Adams.....	13	.....	18,103	44	18,147	\$ 42,193	\$ 2.32	249	88
Appanoose.....	47	732,873	22,235	16,255	771,363	1,284,253	1.66	198	2,032
Boone.....	11	235,062	24,790	4,672	264,524	509,624	1.93	221	727
Dallas.....	4	12,376	4,364	2,105	18,845	37,557	1.99	205	61
Davis.....	6	.....	3,633	.....	3,633	6,093	1.68	159	22
Greene.....	6	.....	11,501	72	11,573	15,345	1.33	132	51
Guthrie.....	2	.....	2,300	.....	2,300	4,875	2.12	200	12
Jasper.....	16	183,680	45,705	6,005	235,390	334,963	1.43	219	383
Jefferson.....	5	6,000	4,084	200	10,284	19,146	1.86	217	29
Keokuk.....	13	145,976	10,879	3,536	160,401	251,769	1.57	210	429
Lucas.....	3	223,218	6,983	8,661	238,862	318,993	1.33	259	460
Mahaska.....	18	500,791	37,803	10,651	549,245	732,203	1.33	199	1,168
Marion.....	24	233,061	31,878	4,785	269,724	290,419	1.08	218	474
Monroe.....	10	1,303,480	22,014	24,228	1,349,722	1,736,432	1.29	266	2,158
Page.....	5	.....	10,022	48	10,070	25,277	2.51	222	45
Polk.....	20	765,345	213,975	28,540	1,007,860	1,507,431	1.50	248	1,741
Scott.....	7	.....	10,176	182	10,358	19,858	1.92	148	41
Story.....	1	.....	244	.....	244	732	3.00	70	7
Taylor.....	3	8,357	4,585	65	13,007	29,186	2.24	218	53
Van Buren.....	5	10,836	3,967	13	14,816	24,499	1.65	240	32
Wapello.....	16	257,937	77,229	5,413	340,579	460,056	1.36	260	668
Warren.....	8	9,727	10,200	200	20,127	38,288	1.90	178	76
Wayne.....	4	53,199	9,667	1,298	64,164	109,734	1.71	204	208
Webster.....	16	109,341	27,449	3,217	140,007	256,470	1.83	232	299
Small producers.....	11	.....	2,016	.....	2,016	3,403	1.69	160	12
Total.....	274	4,791,259	615,702	120,190	5,527,263	\$ 8,058,799	\$ 1.46	218	11,205

The effect of the anthracite coal strike and the consequent high price of bituminous coal greatly stimulated the production in Iowa. The increase is rendered obvious when the production for the year ending June 30, 1903, is inspected. Table III shows the number of mines in operation, tons of coal produced and number of miners and others employed and is taken from the Eleventh Biennial Report of the State Mine Inspectors.

TABLE No. III.

COAL PRODUCTION FOR THE YEAR ENDING JUNE 30, 1903.

COUNTIES.	Number of mines.	Tons of coal of all grades produced.	Number of miners employed.	Other employees.	Total number employed.
Adams.....	12	16,462	85	16	101
Appanoose.....	70	892,692	1,889	600	2,499
Boone.....	12	288,655	480	165	645
Dallas.....	6	19,900	75	35	110
Davis.....	4	3,200	12	4	16
Greene.....	6	12,711	56	9	65
Guthrie.....	13	16,545	75	15	90
Jasper.....	13	323,312	508	182	690
Jefferson.....	4	4,000	13	3	16
Keokuk.....	15	82,532	156	70	226
Lucas.....	3	269,549	327	202	529
Mahaska.....	26	678,826	929	453	1,382
Marion.....	18	293,875	400	175	575
Monroe.....	19	1,600,148	1,758	1,081	2,839
Page.....	4	9,674	37	8	45
Polk.....	25	996,573	1,127	488	1,635
Scott.....	7	18,280	80	12	92
Taylor.....	8	20,618	74	22	96
Van Buren.....	7	18,740	52	20	72
Wapello.....	13	365,165	506	259	765
Warren.....	10	20,265	65	25	90
Wayne.....	8	74,542	185	65	256
Webster.....	10	159,990	280	104	384
Total.....	313	6,185,734	9,169	4,023	13,192

The shifting of the great producing center toward Monroe and Marion counties can be seen to advantage when the counties are tabulated in parallel columns for the years 1900 to 1902 inclusive, as shown in Table IV.

TABLE No. IV.

COAL PRODUCTION FOR THE YEARS 1900 TO 1902, INCLUSIVE.

COUNTIES.	1900.		1901.		1902.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
Adams	21,950	\$ 41,764	18,091	\$ 36,395	18,147	\$ 42,193
Appanoose.....	680,094	1,029,489	721,997	1,121,265	771,363	1,284,253
Boone.....	266,542	451,056	254,054	423,827	264,524	509,624
Dallas.....	16,737	30,531	16,987	31,072	18,845	37,557
Davis	1,398	2,395	1,986	3,913	3,633	6,093
Greene.....	17,044	31,699	18,810	31,652	11,573	15,345
Guthrie.....					2,300	4,875
Jasper.....	99,948	135,462	184,670	270,369	235,390	334,963
Jefferson.....	3,650	6,062	3,875	7,568	10,284	19,146
Keokuk.....	258,933	353,145	308,193	425,876	160,403	251,769
Lucas.....	227,921	300,840	221,058	274,416	238,862	318,993
Mahaska.....	1,142,017	1,408,655	929,110	1,161,243	549,245	732,203
Marion.....	186,446	234,009	145,981	173,882	269,724	290,419
Monroe.....	755,286	859,720	1,038,332	1,292,503	1,349,722	1,736,432
Page and Story	8,494	22,725	6,740	16,850	10,314	26,009
Polk.....	827,482	1,250,430	1,025,014	1,492,060	1,007,860	1,507,431
Scott.....	29,846	49,174	17,097	27,376	10,358	19,858
Taylor.....	17,159	34,318	23,499	49,570	13,007	29,186
Van Buren.....	12,108	17,880	12,572	18,997	14,816	24,499
Wapello.....	276,360	359,616	312,174	407,136	340,579	460,056
Warren.....	24,720	34,695	14,661	27,847	20,127	38,288
Wayne.....	65,140	93,584	56,578	88,486	64,164	109,734
Webster.....	123,660	230,092	146,020	265,501	140,007	256,470
Small mines.....	140,000	175,000	140,000	175,000	2,016	3,403
Total.....	5,202,939	\$7,155,341	5,617,499	\$7,822,805	5,527,263	\$8,058,799

No reason can be given to account for the decrease in the number of men employed when compared with preceding years. In the table below is given the average number of days worked and the number of men employed during the past ten years.

YEARS.	AVERAGE NUMBER OF DAYS WORKED.	NUMBER OF MEN EMPLOYED.
1893.....	204	8,863
1894.....	170	9,995
1895.....	189	10,066
1896.....	178	9,672
1897.....	201	10,703
1898.....	218	10,256
1899.....	229	10,268
1900.....	228	11,601
1901.....	223	13,032
1902.....	218	11,205

According to the authority of the United States Geological Survey, Iowa ranked eighth in tonnage and sixth in the value of the output for 1901, producing 2½ per cent of the bituminous coal of the entire country. The table below shows the rank of the ten leading producers.

	TONS.	VALUE.
Pennsylvania (bituminous only).....	82,305,946	\$ 81,397,585
Illinois.....	27,331,552	28,163,937
West Virginia.....	24,068,402	20,848,184
Ohio.....	20,943,807	20,928,158
Alabama.....	9,099,052	10,000,892
Indiana.....	6,918,225	7,017,143
Colorado.....	5,700,015	6,441,891
Iowa.....	5,617,499	7,822,805
Kentucky.....	5,469,986	5,213,076
Kansas.....	5,113,127	5,046,491

Iowa's production during the past nine years, with average price per ton and value, may be viewed in the table below:

YEARS.	SHORT TONS.	AVERAGE PRICE PER TON.	VALUE.	AUTHORITY.
1894	3,967,253	\$1.26	\$4,999,939	U. S. G. S.
1895	4,156,074	1.20	4,982,102	U. S. G. S.
1896	3,954,028	1.17	4,628,022	U. S. G. S.
1897	4,611,865	1.13	5,219,503	U. S. G. S.
1898	4,618,842	1.14	5,260,716	U. S. G. S.
1899	5,177,479	1.24	6,399,338	U. S. G. S.
1900	5,202,939	1.38	7,155,341	U. S. G. S.
1901	5,617,499	1.39	7,822,805	U. S. G. S.
1902	5,527,263	1.46	8,058,799	Iowa Geol. Surv.

CLAY.

In spite of the large amount of time lost and the embarrassments due to an excess of wet weather, the clay goods marketed in 1902 brought the producers 2 per cent more money than the production for 1901. The total output of clay goods shows a slight shrinkage but the higher prices more than made good the reduction in output. The greatest increases are shown in drain

tile, sewer pipe, hollow building block and pottery while the greatest shrinkage occurred in burnt clay ballast. Slight reduction both in quantity and value is shown for building, face and paving brick.

The clay wares produced in 1902 were distributed as follows:

	1902.		1901.		Per cent Increase.	Per cent decrease.
	Thousands.	Value.	Thousands.	Value.		
Common brick...	236,399	\$ 1,624,673	254,432	\$ 1,651,926	.....	1.5
Front brick	7,584	81,211	8,577	85,330	.....	5.
Paving brick.....	21,779	212,537	22,530	227,378	.....	6.5
Fancy or orna- mental		1,690		2,229	.....	24.
Fire brick.		850		803	.....	5.8
Drain tile.....		673,122		516,714	32.2	.....
Sewer pipe.....		76,000		53,500	42.	.....
Hollow block.....		104,324		59,270	76.	.....
Sidewalk brick...		1,335		1,570	.....	14.8
Tile, not drain tile.		2,590			.....
Railway ballast...		13,527		101,500	.....	86.7
Pottery		45,387		26,200	73.	.....
Miscellaneous.....		6,345		17,780	.....	64.
Total.....		\$2,843,591		\$ 2,774,200	.....	.....

The number of factories in operation decreased from 349 in 1901 to 329 for 1902, mainly due to the continued wet weather which made out door drying almost impossible, and open sheds and open kilns unprofitable. Those plants using surface clays were the greatest sufferers.

The distribution of the output for 1902 as compared with the output for 1901 is shown in tabular form below. It is obvious that the excess of moisture proved a great stimulus to the manufacture of drain tile and sewer pipe. The larger sizes of drain tile up to eighteen inches in diameter are gaining favor in some portions of the state in the building of culverts on the public highways. For the manufacture of extra sizes the sewer pipe press is used.

The average price for building brick shows a sharp advance, common brick selling at the yards at an average of \$6.87 as com-

pared with \$6.49 and \$6.47 for the years 1901 and 1900 respectively. Face brick sold for an average of \$10.71 per M against \$9.95 per M for the year preceding. The average price of paving brick did not change materially. Fire brick and ornamental brick are not produced in quantity. All of the fire brick manufactured in the state are made by the stiff mud process without the addition of "grog." Hollow block show a good increase in the counties which ship the bulk of their production considerable distances.

The distribution of clay products by counties, showing the common brick and total brick in thousands, the values of common brick and of total brick, value of drain tile and total value of clay products are shown in Table V.

TABLE V.
CLAY PRODUCTION BY COUNTIES FOR 1902.

COUNTIES.	Number of producers.	THOUSANDS.		VALUE.			
		Common brick.	Total brick.	Common brick.	Total brick.	Drain tile.	Total clay.
Adair	4	1,370	1,470	\$ 10,360	\$ 11,760	\$ 450	\$ 12,210
Adams	6	2,825	2,825	19,650	19,650	300	26,652
Appanoose	2	2,275	2,275	15,950	15,950	.....	15,950
Audubon	1	1,800	1,800	12,000	12,000	300	12,300
Benton	6	1,725	1,779	11,425	11,864	10,559	22,423
Black Hawk	3	2,343	2,343	15,104	15,104	.....	15,104
Boone	10	4,169	5,410	33,092	46,377	6,860	53,987
Bremer	2	157	157	1,252	1,252	.....	1,252
Buchanan	1	35	35	280	280	.....	280
Buena Vista	3	450	450	3,600	3,600	18,400	22,000
Butler	1	256	256	1,966	1,966	.....	1,966
Calhoun	3	125	125	1,000	1,000	11,500	14,500
Carroll	1	1,200	1,200	8,400	8,400	.....	8,400
Cass	5	1,670	1,670	12,405	12,405	.....	12,405
Cedar	1	670	670	4,685	4,685	3,633	8,318
Cerro Gordo	3	8,900	8,900	57,850	57,850	84,200	211,420
Cherokee	1	1,139	1,139	8,500	8,500	300	8,800
Chickasaw	1	100	100	600	600	.....	600
Clarke	1	400	400	2,800	2,800	.....	2,800
Clayton	3	1,240	1,240	7,328	7,328	200	7,608
Clinton	5	4,325	4,325	25,100	25,100	2,750	27,850
Crawford	2	1,700	1,720	11,600	11,820	.....	11,820
Dallas	8	4,197	5,280	30,275	43,410	45,692	89,102

MINERAL PRODUCTION OF IOWA.

TABLE V—CONTINUED.

CLAY PRODUCTION BY COUNTIES FOR 1902.

COUNTIES.	Number of producers.	THOUSANDS.		VALUE.			
		Common brick.	Total brick.	Common brick.	Total brick.	Drain tile.	Total clay.
Davis.....	3	375	375	\$ 2,775	\$ 2,775		\$ 2,775
Decatur.....	3	750	750	5,175	5,175	\$ 200	5,375
Delaware.....	3	800	800	5,000	5,000		6,800
Des Moines.....	5	2,458	2,458	21,319	21,319	800	24,264
Dubuque.....	3	4,700	4,700	29,400	29,400		29,400
Emmet.....	1	50	50	400	400	350	750
Fayette.....	4	1,621	1,921	10,710	13,710		14,710
Floyd.....	1	400	400	2,800	2,800	93	2,893
Franklin.....	1	52	52	314	314	273	587
Fremont.....	5	2,515	2,515	14,528	14,528		14,528
Greene.....	1	200	200	1,400	1,400	23,600	25,000
Grundy.....	1	200	200	1,400	1,400		1,400
Guthrie.....	5	1,496	1,496	10,714	10,714	23,916	34,630
Hamilton.....	2	2,200	2,200	15,400	15,400	52,400	67,800
Hancock.....	1	100	100	850	850	1,500	2,350
Hardin.....	6	1,150	1,150	8,435	8,435	54,259	62,694
Harrison.....	7	3,020	3,030	22,265	22,345		22,345
Henry.....	4	767	767	5,490	5,740	8,320	14,060
Howard.....	1	1,000	1,000	6,500	6,500	500	7,500
Humboldt.....	1	143	143	1,000	1,000	10,000	11,000
Ia.....	1	615	615	4,739	4,739		4,739
Iowa.....	5	2,827	2,877	17,915	18,415	8,400	26,815
Jasper.....	9	3,450	3,950	22,950	27,200	4,300	31,500
Jefferson.....	2	830	830	6,022	6,022	11,676	17,698
Johnson.....	7	5,079	5,079	28,275	28,275	9,000	37,275
Jones.....	2	807	807	5,456	5,456	2,420	7,876
Keokuk.....	7	1,300	1,300	9,200	9,200	21,850	31,450
Kossuth.....	1	160	160	960	960		960
Lee.....	5	1,310	1,490	7,590	8,900	225	9,125
Linn.....	8	5,205	5,205	34,111	34,111	4,364	38,475
Louisa.....	4	617	617	3,900	3,900	700	7,400
Lucas.....	1	500	500	3,000	3,000		3,000
Madison.....	1	500	500	4,500	4,500	1,500	6,000
Mahaska.....	6	4,323	6,935	31,249	57,675	8,000	65,775
Marion.....	5	2,288	2,288	16,722	16,722	2,914	19,636
Marshall.....	8	3,538	4,038	22,134	26,134	6,977	33,111
Mills.....	4	2,300	2,300	14,500	14,500		14,500
Monroe.....	3	205	205	1,540	1,540		8,365
Montgomery.....	5	4,910	4,910	35,140	35,390		40,540
Muscatine.....	10	4,970	4,970	32,078	32,108		37,408
Page.....	4	4,200	4,200	27,900	27,900	700	28,600
Plymouth.....	1	500	500	3,500	3,500		3,500
Pocahontas.....	2	340	340	2,420	2,420	31,000	33,420
Polk.....	18	33,033	45,256	250,306	377,662	30,150	490,412
Pottawattamie.....	8	11,064	12,664	69,688	82,488		82,488
Poweshiek.....	3	642	642	4,300	4,300	9,200	14,400
Ringgold.....	2	1,500	1,500	9,500	9,500	1,000	10,500
Sac.....	1	150	150	1,050	1,050		1,050
Scott.....	6	4,844	5,844	30,288	40,288	300	42,988
Shelby.....	2	1,700	1,700	12,750	12,750	140	12,890

TABLE V—CONTINUED.

CLAY PRODUCTION BY COUNTIES FOR 1902.

COUNTIES.	Number of producers.	THOUSANDS.		VALUE.			
		Common brick.	Total brick.	Common brick.	Total brick.	Drain tile.	Total clay.
Sioux.....	2	2,100	2,100	\$ 14,800	\$ 14,800		\$ 14,800
Story.....	4	934	1,284	7,697	10,647	\$ 15,500	26,147
Tama.....	5	4,038	5,576	25,986	40,970	13,500	54,470
Taylor.....	4	1,520	1,520	10,421	10,421		10,421
Union.....	2	2,810	2,835	19,670	19,920	380	20,300
Van Buren.....	5	1,190	1,190	8,060	8,160	200	8,360
Wapello.....	5	9,470	10,800	57,341	67,419	6,414	73,833
Washington.....	3	2,700	2,700	17,500	17,500	5,100	22,600
Wayne.....	5	1,345	1,345	9,120	9,120	1,000	10,120
Webster.....	10	11,441	14,658	68,450	103,450	102,657	250,403
Winneshek.....	2	725	725	4,700	4,700		4,700
Woodbury.....	6	27,211	28,641	204,948	218,543		233,543
Wright.....	4	140	140	1,200	1,200	12,100	13,300
Total.....	329	236,399	265,762	\$1,624,673	\$1,920,961	\$673,122	\$2,843,591

During the four years preceding 1902 Iowa ranked eighth as a clay producer. In 1901 Iowa manufactured 2.48 per cent of all of the clay products marketed in the United States. Only four states, Ohio, Pennsylvania, Illinois and Indiana show a larger number of producers.

The table below gives the ten leading producers of clay products for 1901 according to the figures given in the mineral resources for 1901.

RANK.	STATE.	OPERATORS REPORTING.	VALUE TOTAL CLAY PRODUCTS.	PER CENT TOTAL PRODUCT FOR THE UNITED STATES.
1	Ohio.....	813	\$21,574,985	19.58
2	Pennsylvania.....	507	15,321,742	13.90
3	New Jersey.....	160	11,681,878	10.60
4	Illinois.....	550	9,642,490	8.75
5	New York.....	276	8,291,718	7.52
6	Missouri.....	259	4,474,553	4.06
7	Indiana.....	540	4,466,454	4.05
8	Iowa.....	341	2,737,825	2.48
9	West Virginia.....	53	1,946,480	1.77
10	Massachusetts.....	90	1,870,837	1.70

STONE.

The majority of the stone producers of the state report the demand for stone good or equal to that for 1901 but add that the rainy weather and consequent flooded streams made quarrying operations impossible for a considerable portion of the year. The greatest falling off was in the production of lime. Building stone shows a loss of more than 20 per cent. Riprap and rubble show an increase of more than 1.50 per cent. The production was distributed as follows:

	1902.	1901.
Limestone used for—		
Building purposes.....	\$202,476	\$ 261,160
Flagging and curbing.....	11,391	18,095
Lime.....	131,532	230,188
Riprap and rubble.....	176,883	66,355
Crushed stone—		
Macadam.....	93,433	68,580
Railway ballast.....	15,944	48,509
Concrete.....	24,445	75,182
Miscellaneous.....	6,459	15,387
Sandstone.....	10,798	13,096
Marble.....	200	.....
Total.....	\$673,561	\$ 796 852

The "Good Roads" movement is reflected in the increased production of crushed stone for macadam. The increase for the year is about 35 per cent. Table VI gives the production by counties and specifies the various grades of stone put upon the market.

TABLE No. VI.
PRODUCTION OF LIMESTONE BY COUNTIES FOR 1902.

COUNTIES.	Number of producers.	Building.	Flagging and curbing.	Lime.	Macadam.	Railway ballast.	Concrete.	Rubble and riprap.	Other purposes.	Total.
Adams.....	2	1,950					50	150		2,150
Allamakee.....	3	4,290						39	3,100	7,429
Appanoose.....	4	72						150		222
Benton.....	8	24		2,020				3,840		5,884
Black Hawk.....	11	2,846	204		750			7,615		11,415
Cedar.....	3	13,826		13,678	30,863		2,462	8,205		69,034
Cerro Gordo.....	9	9,291	1,115	5,075		10,632	758	8,043		34,914
Clarke.....	7	1,435								1,435
Clayton.....	6	920	800	750	640			3,745		6,855
Clinton.....	10	12,086	200		3,951			75		16,312
Dallas.....	2	68								68
Decatur.....	5	1,530	25						192	1,747
Delaware.....	3	2,400						275		2,675
Des Moines.....	11	8,796	2,610		625		3,525	16,077		31,633
Dubuque.....	14	11,743	1,708	10,700	1,500	4,550	5,050	19,018		54,269
Fayette.....	6	2,005		1,000				2,308		5,313
Floyd.....	10	3,419	124					3,150		6,693
Hardin.....	6	4,555					50	6,000		10,605
Hamilton.....	2	2,873								2,873
Henry.....	2	1,714					363		32	2,109
Howard.....	5	2,111			108			5		2,224
Humboldt.....	2	1,825	24							1,849
Jackson.....	7	525		69,098	200			188		70,011
Johnson.....	2	600			3,400		100	1,400		5,500
Jones.....	12	34,088	1,566		14,195	622	4,574	34,621		89,666
Keokuk.....	12	2,235	18		54			3		2,450
Linn.....	7	5,600	20	10,000	2,040			75		17,735
Louisa.....	7	1,488	160				5	2,552		4,205

PRODUCTION OF LIMESTONE BY COUNTIES.

TABLE No. VI—CONTINUED.
 PRODUCTION OF LIMESTONE BY COUNTIES FOR 1902.

COUNTIES.	Number of producers.	Building.	Flagging and curbing.	Lime.	Macadam.	Railway ballast.	Concrete.	Rubble and riprap.	Other purposes	Total.
Lee.....	11	4,620	601	6,935	.....	.....	6,183	1,893	1,510	21,742
Madison.....	10	11,408	.....	.....	10,435	.....	.....	2,885	.....	24,728
Mahaska.....	2	231	48	.....	.....	.....	.....	6	.....	285
Marion.....	2	.....	.....	.....	.....	.....	.....	2,500	.....	2,500
Marshall.....	2	14,700	.....	.....	16,065	.....	.....	27,331	.....	58,096
Mitchell.....	6	1,485	1,800	.....	.....	.....	25	210	25	3,545
Monroe.....	2	491	13	.....	.....	.....	.....	.....	.....	504
Montgomery.....	4	1,305	.....	.....	.....	.....	.....	3,800	.....	5,105
Scott.....	13	9,410	.....	12,266	7,665	.....	.....	19,658	.....	48,999
Tama.....	3	200	.....	.....	17	.....	.....	50	.....	267
Van Buren.....	3	457	.....	.....	.....	.....	.....	.....	200	657
Wapello.....	6	20,919	215	.....	800	140	1,310	526	.....	23,910
Washington.....	6	2,935	.....	.....	125	.....	.....	425	1,400	4,885
Winneshiek.....	1	.....	.....	.....	.....	.....	.....	65	.....	65
Total.....	249	202,476	11,391	131,522	93,433	15,944	24,455	176,883	6,459	662,563

Jackson county suffered the greatest shrinkage owing to the falling off in lime burning. Cedar, Jones, Dubuque and Scott suffered less, while Des Moines, Marshall and Cerro Gordo show good gains over the preceding year.

The sandstone production shows but slight change. Webster county is still the principal producer. The production of sandstone was distributed as follows:

Building stone	\$ 6,331
Rubble	3,157
Flagging	75
Concrete	35
Guttering	1,200
Total	\$10,798

Number of producers, 24.

In 1901 Iowa ranked twenty-second as a stone producer and eighth in the production of limestone, producing 2.94 per cent of the limestone produced in the entire country. The production of stone for the past ten years is given in the table below.

YEAR.	Sandstone.	Limestone.	Total.
1893.....	\$ 18,347	\$547,000	\$ 565,347
1894.....	11,639	616,630	628,269
1895.....	5,575	449,501	455,076
1896.....	12,351	410,037	422,388
1897.....	14,771	480,572	495,343
1898.....	6,562	557,024	563,586
1899.....	17,239	792,685	809,924
1900.....	9,379	595,507	604,886
1901.....	14,341	777,484	791,825
1902.....	10,798	662,563	673,361

GYPSUM.

The gypsum production for 1902 was about the same as for 1901. During the year 143,632 short tons of crude gypsum valued at \$134,726 were produced and sold as:

Wall cement or plaster.....	100,314	\$290,242
Plaster of Paris	17,865	43,593
Land plaster.....	2,000	3,000
Crude gypsum	600	900
	<hr/>	<hr/>
Total.....	120,779	\$337,735

LEAD AND ZINC.

No zinc was produced and marketed in Iowa during 1902. A small amount of pyritiferous ore was mined chiefly in development work but on account of the low prices which prevailed for inferior ores it was not put upon the market. Development work for lead continued to be more active during the year than for a number of years. A number of the old properties are making substantial improvements and new mines are being opened so that a much larger output may be confidently predicted for 1903. The average price for galena was \$23.00 per thousand pounds at the mine and practically all of the lead ore produced in the state was sold to the local smelter owned and operated by Wm. G. Waters. Pig lead sold for \$4.00 per cwt. on the average.

The lead production for the year amounted to 486,000 pounds and sold for \$11,178.