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QUARRY ACCIDENTS

IN THE

UNITED STATES

DURING THE CALENDAR YEAR

1939

BY

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QUARRY ACCIDENTS IN THE UNITED STATES DURING THE CALENDAR YEAR 1939 [1]

By WILLIAM W. ADAMS [2] AND VIRGINIA E. WRENN [3]

INTRODUCTION

Progress made by the quarrying and related industries of the United States during 1939 included increases in the number of men employed and the number of man-hours worked and reductions in the death and injury rates per million man-hours of exposure to risk. Forty-seven States reported quarries in operation; in each of 26 States the industry employed 1,000 or more men. Of these 26 States, 16 reported lower accident rates than in 1938. Among the operations of various types for which separate figures are published in this bulletin, the limestone, lime, and cement groups reported lower accident rates.

During 1939, 79,449 men were employed in the quarrying industries. The period of operation of the plants averaged 236 days per employee, with a total working time that equaled nearly 144 million man-hours. Accidents at the plants resulted in 48 deaths and 5,204 disabling injuries among the workers. Expressed as frequency rates, the accidents represented 0.33 fatality and 36.18 injuries for each million man-hours of work performed during the year. The major cause of fatal accidents inside the quarries was falls or slides of rock or overburden; nine deaths were reported from this cause. Four men were killed by explosives and four by falls of persons. Nonfatal injuries inside the quarries were due chiefly to handling materials; about one-sixth of the total number at all operations in connection with quarries and related plants were in this class. Flying objects also caused numerous injuries, although only about one-half as many as did handling materials. Next in numerical importance were injuries from falls of persons. Then followed accidents caused by falls or slides of rock or overburden and accidents caused by machinery.

Work inside the quarry pits was considerably more hazardous than work outside the quarries, such as rock dressing, rock finishing, or the manufacture of cement or lime. In fact, the accident rate among employees at the outside plants was only about one-third as high as that among men working inside the quarries.

The accident-severity rate for the entire quarrying and related industries cannot be given, as it is impracticable to obtain a full account of the circumstances surrounding each injury that occurred in the entire industry; however, the rate may be estimated accurately

[1] Work on manuscript completed November 1940. Lucile S. Horton assisted in the preparation of the statistical tables herein presented.

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enough to determine the trend of accident severity by applying to the reported number of accidents the number of days of disability per accident as shown by reports from a selected list of quarrying companies, namely, those that participated in the National Safety Competition conducted by the Bureau of Mines. Reports from the plants enrolled in the competition for the past 3 years, 1937–39, showed that the period of disability for temporary injuries averaged 34 days per injury. Reports from the same companies showed that injuries causing permanent partial disability averaged 1,248 days of disability per injury when each accident of this class was weighted according to the nature of disability and part of the body affected in accordance with the standard accident table used for such injuries. Every death or permanent total disability was assigned a uniform charge of 6,000 days of disability. When these factors were applied to the deaths, permanent disabilities, and temporary injuries shown by the reports covering all quarry and related operations in the United States during 1939, an accident-severity rate of 4.75 per thousand man-hours of exposure was indicated. The corresponding rate for 1938, computed in the same manner, was 6.57.

Pennsylvania led all other States in number of employees, with more than twice as many as Ohio, which employed the second largest number. Several of the 26 larger States had no fatal accidents during the year; Michigan led these States with the largest number of man-hours worked without a fatality within the State. Michigan also had the lowest frequency rate for nonfatal injuries. (See tables 1 to 3.)

TABLE 1.—*Relative standing of States having 1,000 or more men employed at quarries, including outside works, classified according to number of men employed, and fatality and injury rates per million man-hours of employment during the year ended Dec. 31, 1939*

Relative standing	State	Number of men employed	Relative standing	State	Fatality rates	Relative standing	State	Injury rates
1	Pennsylvania	13,044	1	Michigan		1	Michigan	9.62
2	Ohio	5,510	2	Tennessee		2	Iowa	13.04
3	Indiana	4,235	3	Iowa		3	Kansas	15.99
4	New York	3,983	4	Kansas		4	Texas	20.91
5	Missouri	3,881	5	Washington		5	Ohio	21.06
6	Illinois	3,706	6	New Jersey		6	New York	22.17
7	California	3,517	7	North Carolina		7	West Virginia	24.46
8	Michigan	3,442	8	Maine		8	Illinois	27.21
9	Virginia	3,316	9	Pennsylvania	0.12	9	Georgia	27.65
10	Tennessee	2,966	10	Alabama	.23	10	Pennsylvania	30.19
11	Vermont	2,536	11	Ohio	.28	11	Alabama	30.97
12	Alabama	2,388	12	New York	.29	12	Indiana	34.21
13	Texas	1,949	13	Virginia	.31	13	North Carolina	34.89
14	Georgia	1,869	14	West Virginia	.31	14	New Jersey	38.85
15	West Virginia	1,689	15	Illinois	.35	15	California	40.61
16	Iowa	1,666	16	Minnesota	.38	16	Minnesota	41.67
17	Minnesota	1,581	17	Massachusetts	.42	17	Maine	42.74
18	Kansas	1,557	18	Kentucky	.43	18	Massachusetts	43.61
19	Kentucky	1,418	19	Wisconsin	.45	19	Maryland	46.27
20	Wisconsin	1,402	20	Missouri	.48	20	Missouri	50.97
21	Massachusetts	1,310	21	Indiana	.54	21	Washington	51.13
22	Washington	1,198	22	California	.61	22	Vermont	56.19
23	New Jersey	1,092	23	Vermont	.61	23	Virginia	57.03
24	Maine	1,086	24	Georgia	.90	24	Kentucky	57.42
25	North Carolina	1,020	25	Texas	1.07	25	Tennessee	59.93
26	Maryland	1,006	26	Maryland	1.71	26	Wisconsin	79.18
	United States, total	79,449		United States, average	0.33		United States, average	36.18

TABLE 2.—*Percentage by which each State's accident-frequency rate (deaths and injuries) per million man-hours of employment in quarrying and related industries decreased or increased in 1939 compared with 1938* [1]

State	Number of accidents per million man-hours in 1939	Change compared with 1938, percent	State	Number of accidents per million man-hours in 1939	Change compared with 1938, percent
Michigan	9.62	−47.3	North Carolina	34.89	−2.3
Georgia	28.55	−42.1	Texas	21.98	−.1
West Virginia	24.77	−23.9	New Jersey	38.85	+2.1
New York	22.46	−19.7	Minnesota	42.05	+6.0
Kansas	15.99	−19.5	Pennsylvania	30.31	+7.2
Iowa	13.04	−18.6	Maine	42.74	+9.3
Alabama	31.20	−18.4	Washington	51.13	+9.7
Ohio	21.34	−17.5	Maryland	47.98	+11.3
Kentucky	57.85	−12.9	Missouri	51.45	+13.6
Wisconsin	79.63	−7.2	Virginia	57.34	+13.9
Massachusetts	44.03	−6.5	Vermont	56.80	+18.8
Indiana	34.75	−3.8	Illinois	27.56	+24.3
Tennessee	59.93	−3.8			
California	41.22	−2.8	United States, average	36.51	−4.4

[1] States listed are those covered by table 1.

TABLE 3.—*Accident-frequency rates per million man-hours of employment in the quarrying industry in the United States, 1938 and 1939*

Kind of quarry	At quarries			At outside works			Total		
	1938	1939	Percent change in 1939	1938	1939	Percent change in 1939	1938	1939	Percent change in 1939
Cement rock [1]	21.78	21.62	−0.7	8.19	7.14	−12.8	9.98	9.02	−9.6
Granite	51.95	49.49	−4.7	30.84	34.29	+11.2	42.93	42.98	+.1
Limestone	67.18	62.19	−7.4	40.71	27.20	−33.2	57.12	49.16	−13.9
Limestone (chief product, lime)	74.23	70.89	−4.5	38.96	36.59	−6.1	52.51	49.59	−5.6
Marble	77.58	89.72	+15.6	46.87	44.64	−4.8	58.39	60.91	+4.3
Sandstone	70.77	78.42	+10.8	33.45	36.95	+10.5	58.15	65.31	+12.3
Slate	63.88	88.90	+39.2	52.50	59.13	+12.6	57.04	70.98	+24.4
Trap rock	72.91	85.27	+17.0	42.37	28.47	−32.8	62.85	65.95	+4.9
Total	61.12	61.01	−0.2	23.54	20.97	−10.9	38.19	36.51	−4.4

[1] Includes limestone or other stone used in the manufacture of cement.

ACKNOWLEDGMENTS

The Bureau of Mines gratefully acknowledges the cooperation of the quarry operators throughout the United States, whose voluntary reports of accidents and employment form the basis of the tables in this bulletin.

SCOPE OF STATISTICS

The tables in this bulletin have been compiled by the Bureau of Mines from reports received directly from operators of quarries, and they represent all phases of the quarrying industry. The total figures are based upon returns representing 2,128 quarries that were active all or part of the year. The figures also cover crushing and screening, rock dressing, and the manufacture of lime and cement insofar as those operations are conducted by the quarry companies.

The Bureau of Mines is authorized to collect data on accidents at mines and quarries, but there is no Federal law that compels operators to supply such data; hence the reports received from operators are voluntary responses to the Bureau's requests for information. Although the figures presented herein may not be complete for the entire industry, every effort has been exerted to make them so, and the figures given are believed to be thoroughly representative of the hazards to which quarry workers are exposed. Moreover, the figures are comparable as between States, a fact extremely significant in view of the lack of uniformity among the States as regards classes of plants covered by State laws, classes of accidents covered by State reports, and other factors that tend to make impracticable or impossible comparison of the accident experience of one State with that of another or comprehension of the relative importance of the various causes of accidents in the industry as a whole.

CLASSIFICATION OF QUARRIES

The quarries covered by this report have been classified according to the kind of rock produced, as follows: Cement rock (including other stone used in making cement), limestone, marble, sandstone, slate, trap rock, and granite. Separate statistical tables are presented for each group and for all groups combined. Clay, sand, and gravel pits are not included.

CLASSIFICATION OF INJURIES

From 1915 to 1929 the Bureau's statistics of accidents at quarries divided all injuries into five classes, as follows: (1) Fatalities, (2) permanent total disabilities, (3) permanent partial disabilities, (4) temporary disabilities lasting more than 14 days, and (5) temporary disabilities lasting more than the remainder of the day on which the accident occurred but not exceeding 14 days. Beginning with 1930, classes (4) and (5) were consolidated under the general class of temporary injuries.

Figures covering accidents at quarries for the 5-year period 1935–39 are given in table 34, page 61.

DEFINITION OF ACCIDENT RATES

All accident rates shown in this publication, except where otherwise stated, have been calculated upon the basis of a million man-hours of employment or exposure to risk.

TABLE 4.—*All quarries: Number of active quarries, men employed, and man-days, by States, during the year ended Dec. 31, 1939*

State	Number of active quarries [1]	Men employed									Man-days of employment								
		At quarry		At outside works						Total	At quarry		At outside works						Total
		Open quarry	Underground quarry	Crusher	Rock-dressing plant	Granules and flour plant	Cement mill	Lime-kiln	Miscellaneous		Open quarry	Underground quarry	Crusher	Rock-dressing plant	Granules and flour plant	Cement mill	Lime-kiln	Miscellaneous	
Alabama	31	862	82	178	222	------	795	152	97	2,388	207,361	19,945	42,376	56,570	------	214,580	47,058	16,157	604,047
Arizona	11	151	------	27	------	------	------	42	22	242	42,215	------	4,091	------	------	------	14,397	6,980	67,683
Arkansas	9	104	------	20	------	4	64	51	------	243	21,429	------	3,622	------	160	15,552	16,419	------	57,182
California	106	1,153	176	366	132	15	1,288	82	305	3,517	262,006	45,189	88,328	36,097	2,277	389,272	26,932	70,096	920,197
Colorado	36	251	15	29	59	------	134	10	38	536	49,786	3,828	6,054	13,116	------	33,807	2,654	10,664	119,909
Connecticut	30	298	------	82	61	3	------	12	30	486	71,204	------	20,242	14,330	867	------	3,084	6,984	116,711
Florida	25	332	------	184	3	------	217	22	18	776	74,854	------	34,354	60	------	41,702	6,949	5,537	163,456
Georgia	34	758	6	164	674	19	208	16	24	1,869	174,373	558	34,792	139,413	2,071	57,091	4,800	5,088	418,186
Idaho	8	72	------	16	------	------	53	------	6	147	6,408	------	1,249	------	------	11,730	------	1,836	21,223
Illinois	77	1,817	92	521	10	------	894	56	316	3,706	369,128	25,432	101,982	2,000	------	241,366	16,204	60,380	816,492
Indiana	106	1,450	7	333	1,272	------	1,035	103	35	4,235	281,724	1,568	60,016	282,263	------	300,334	28,581	7,402	961,888
Iowa	47	479	20	165	3	------	905	------	94	1,666	78,536	4,460	26,877	806	------	248,969	------	22,521	382,169
Kansas	44	638	45	131	44	------	662	------	37	1,557	96,796	4,198	21,364	12,200	------	173,189	------	11,062	318,809
Kentucky	47	813	99	258	10	------	216	8	14	1,418	148,429	15,525	46,882	1,350	------	57,046	1,681	3,643	274,556
Maine	25	492	49	43	365	------	91	33	13	1,086	64,129	8,170	8,792	37,164	------	25,118	11,747	3,340	158,460
Maryland	48	481	2	126	4	17	282	50	44	1,006	107,350	204	26,904	244	5,568	66,399	12,109	12,646	231,424
Massachusetts	51	622	------	177	341	12	------	93	65	1,310	130,831	------	41,022	76,756	2,682	------	31,237	16,765	299,293
Michigan	30	1,015	------	397	------	2	1,481	42	505	3,442	215,211	------	78,670	------	340	443,607	13,899	127,302	879,029
Minnesota	56	627	------	124	589	5	187	46	3	1,581	98,547	------	9,574	153,552	1,093	52,058	13,009	840	328,673
Missouri	108	1,671	377	336	134	2	836	355	170	3,881	271,768	84,090	61,466	39,778	600	248,723	108,575	49,028	864,028
Montana	19	488	------	6	3	------	74	8	------	579	81,560	------	1,962	463	------	18,574	2,299	------	104,858
Nebraska	6	79	------	34	------	------	194	------	12	319	17,203	------	6,716	------	------	69,928	------	4,296	98,143
New Hampshire	10	117	------	18	126	------	------	------	------	261	18,579	------	1,296	29,266	------	------	------	------	49,141
New Jersey	31	485	------	166	------	------	376	14	51	1,092	107,362	------	30,472	------	------	107,160	3,647	14,849	263,490
New York	109	1,605	48	672	25	33	1,230	53	317	3,983	323,419	12,700	131,295	5,537	8,731	321,282	15,109	73,305	891,378
North Carolina	18	531	------	227	245	------	------	4	13	1,020	120,900	------	53,744	58,412	------	------	1,460	3,373	237,889
Ohio	157	2,080	140	791	333	------	1,112	750	304	5,510	423,340	31,520	159,712	84,214	------	330,568	239,202	85,033	1,353,589
Oklahoma	25	385	------	94	48	------	357	17	------	901	87,651	------	19,624	12,476	------	97,309	5,840	------	222,900
Oregon	24	261	------	41	------	------	212	------	2	516	51,820	------	3,926	------	------	39,551	------	552	95,849

[1] Includes a small number of mills or other plants not operated in connection with quarries.

TABLE 4.—*All quarries: Number of active quarries, men employed, and man-days, by States, during the year ended Dec. 31, 1939*—Continued

State	Number of active quarries	Men employed								Man-days of employment								
		At quarry		At outside works						At quarry		At outside works						
		Open quarry	Underground quarry	Crusher	Rock-dressing plant	Granules and flour plant	Cement mill	Lime-kiln	Miscellaneous	Total	Open quarry	Underground quarry	Crusher	Rock-dressing plant	Granules and flour plant	Cement mill	Lime-kiln	Miscellaneous	Total
Pennsylvania	337	4,012	773	1,232	928	100	4,363	527	1,109	13,044	870,822	177,317	268,955	225,107	27,540	1,270,020	136,942	285,979	3,262,682
Rhode Island	11	84	12	10	56			3	32	197	14,099	3,000	1,130	10,795			882	8,800	38,706
South Carolina	7	270		171					22	463	71,810		44,414					5,940	122,164
South Dakota	17	324		54	64		49	4	50	545	46,984		8,461	16,693		9,555	1,320	7,330	90,343
Tennessee	56	1,188	127	187	561	4	567	288	44	2,966	280,412	27,091	41,710	149,324	1,200	158,851	77,863	10,859	747,310
Texas	41	442		145	61		996	109	196	1,949	99,833		32,367	15,386		270,805	28,976	50,131	497,498
Utah	10	79		14			118	12	17	240	15,946		2,912			33,199	2,690	5,160	59,907
Vermont	60	1,158	207	112	977	3		76	3	2,536	273,694	52,308	25,214	245,476	753		19,977	872	618,294
Virginia	88	1,615	31	511	261	25	274	325	274	3,316	380,532	6,964	123,791	61,390	5,476	74,315	96,149	69,923	818,540
Washington	45	582	2	92	19		433	44	26	1,198	122,900	360	17,993	4,592		141,868	11,535	4,414	303,662
West Virginia	32	596	272	212	23	1	246	146	193	1,689	127,074	71,918	46,478	2,707	250	62,578	46,047	56,086	413,138
Wisconsin	79	820		137	257	9	96	55	28	1,402	160,844		18,124	49,199	1,839	25,352	18,174	6,246	279,778
Wyoming	7	80	29	19			100		15	243	10,724	7,397	4,499			26,114		3,917	52,651
Other States [2]	10	122		52			186	22	6	388	31,078		9,955			52,546	6,025	1,151	100,755
Total	2,128	31,489	2,611	8,674	7,910	254	20,331	3,630	4,550	79,449	6,510,671	603,742	1,773,407	1,836,736	61,447	5,730,118	1,073,472	1,136,487	18,726,080

[2] Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 5.—*All quarries: Number of man-hours and average days active, by States, during the year ended Dec. 31, 1939*

State	Man-hours of employment									Average days of employment per man			Average hours of employment per man per day		
	At quarry		At outside works						Total	At quarry	At outside works	Total	At quarry	At outside works	Total
	Open quarry	Underground quarry	Crusher	Rock-dressing plant	Granules and flour plant	Cement mill	Limekiln	Miscellaneous							
Alabama	1,566,201	161,660	333,607	455,251		1,463,482	322,970	120,498	4,423,669	241	261	253	7.60	7.16	7.32
Arizona	331,170		32,730				113,302	55,840	533,042	280	280	280	7.84	7.93	7.88
Arkansas	168,714		28,976		1,440	124,416	125,877		449,423	206	257	235	7.87	7.85	7.86
California	1,721,148	356,137	598,262	201,771	16,716	2,971,103	199,121	535,083	6,599,341	231	280	262	6.76	7.38	7.17
Colorado	363,034	30,620	46,115	104,927		270,462	21,232	72,717	909,107	202	246	224	7.34	7.78	7.58
Connecticut	582,126		168,800	114,560	6,936		24,672	61,668	958,762	239	242	240	8.18	8.28	8.21
Florida	661,060		328,591	480		333,617	55,591	44,945	1,424,284	225	200	211	8.83	8.61	8.71
Georgia	1,401,680	3,906	286,421	1,100,079	14,497	442,172	38,400	40,706	3,327,861	229	220	224	8.04	7.90	7.96
Idaho	47,837		9,598			77,142		12,852	147,429	89	198	144	7.47	6.72	6.95
Illinois	2,585,918	197,486	776,043	20,000		1,538,921	131,840	410,496	5,660,704	207	235	220	7.05	6.82	6.93
Indiana	2,222,310	12,544	515,609	2,257,693		2,204,564	179,239	62,774	7,454,733	194	244	227	7.89	7.69	7.75
Iowa	646,923	40,136	223,945	5,642		1,904,494		168,909	2,990,049	166	256	229	8.28	7.70	7.82
Kansas	771,531	33,580	171,783	97,600		1,350,911		75,956	2,501,361	148	249	205	7.97	7.79	7.85
Kentucky	1,281,545	130,012	425,849	12,150		456,367	13,453	31,730	2,351,106	180	219	194	8.61	8.49	8.56
Maine	513,285	65,360	70,536	297,308		211,540	78,775	26,724	1,263,528	134	158	146	8.00	7.95	7.97
Maryland	907,816	1,632	225,555	1,952	45,064	379,610	94,848	94,209	1,750,686	223	237	230	8.46	6.79	7.56
Massachusetts	1,051,912		332,835	618,159	21,455		245,952	137,601	2,407,914	210	245	228	8.04	8.05	8.05
Michigan	1,735,551		636,164		2,720	3,449,166	119,571	1,023,524	6,966,696	212	274	255	8.06	7.88	7.93
Minnesota	794,193		86,713	1,206,773	8,969	408,464	104,058	6,720	2,615,890	157	241	208	8.06	7.92	7.96
Missouri	1,912,926	633,223	479,156	315,346	5,000	1,742,963	810,597	359,101	6,258,312	174	277	223	7.15	7.30	7.24
Montana	654,064		15,234	3,700		139,305	18,447		830,750	167	256	181	8.02	7.58	7.92
Nebraska	125,747		55,235			415,805		23,634	620,421	218	337	308	7.31	6.11	6.32
New Hampshire	143,500		8,376	234,128					386,004	159	212	188	7.72	7.93	7.86
New Jersey	836,994		265,904			730,798	29,176	119,019	1,981,891	221	257	241	7.80	7.33	7.52
New York	2,539,583	101,600	1,065,409	44,296	73,960	2,441,433	121,382	559,765	6,947,428	203	238	224	7.86	7.76	7.79
North Carolina	983,080		432,942	467,296			8,760	28,168	1,920,246	228	239	233	8.13	8.01	8.07
Ohio	3,454,819	252,342	1,321,326	673,708		2,557,306	1,713,361	663,546	10,636,408	205	273	246	8.15	7.71	7.86
Oklahoma	693,073		155,654	99,808		715,909	46,720		1,711,164	228	262	247	7.91	7.53	7.68
Oregon	409,520		31,265			282,809		4,416	728,010	199	173	186	7.90	7.23	7.60
Pennsylvania	7,089,019	1,421,840	2,201,171	1,812,814	287,543	8,657,547	1,067,056	2,139,308	24,676,298	219	268	250	8.12	7.30	7.56

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TABLE 5.—*All quarries: Number of man-hours and average days active, by States, during the year ended Dec. 31, 1939*—Continued

State	Man-hours of employment									Average days of employment per man			Average hours of employment per man per day		
	At quarry		At outside works						Total	At quarry	At outside works	Total	At quarry	At outside works	Total
	Open quarry	Underground quarry	Crusher	Rock-dressing plant	Granules and flour plant	Cement mill	Limekiln	Miscellaneous							
Rhode Island	111,426	24,000	9,142	86,360			7,056	65,600	303,584	178	214	196	7.92	7.78	7.84
South Carolina	566,094		356,886					49,419	972,399	266	261	264	7.88	8.07	7.96
South Dakota	373,946		66,947	133,544		57,330	10,560	51,448	693,775	145	196	166	7.96	7.38	7.68
Tennessee	2,295,030	212,729	323,952	1,203,178	10,800	1,183,038	584,717	93,008	5,906,452	234	266	252	8.16	7.73	7.90
Texas	729,448		250,856	123,363		2,073,732	214,242	339,229	3,730,870	226	264	255	7.31	7.55	7.50
Utah	119,866		21,668			239,735	21,000	36,811	439,080	202	273	250	7.52	7.26	7.33
Vermont	2,150,143	418,464	202,588	1,968,205	5,524		159,816	7,106	4,911,846	239	250	244	7.88	8.02	7.94
Virginia	2,999,875	48,746	977,538	538,174	43,808	507,068	725,618	523,956	6,364,783	235	258	247	7.87	7.69	7.78
Washington	948,974	2,280	145,517	36,493		1,078,956	100,693	34,059	2,346,972	211	294	253	7.72	7.74	7.73
West Virginia	978,506	583,397	390,978	21,656	2,000	480,822	362,012	450,847	3,270,218	229	261	245	7.85	7.98	7.92
Wisconsin	1,269,578		149,259	393,594	14,716	228,689	140,672	39,023	2,235,531	196	204	200	7.89	8.12	7.99
Wyoming	85,791	59,179	35,992			208,911		31,338	421,211	166	258	217	8.00	8.00	8.00
Other States [1]	218,955		80,671			459,396	48,196	10,127	817,345	255	262	260	7.05	8.59	8.11
Total	51,043,911	4,790,873	14,341,798	14,650,008	561,148	41,787,983	8,058,982	8,611,880	143,846,583	209	256	236	7.85	7.58	7.68

[1] Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 6.—*All quarries: Fatalities and injuries and rates per million man-hours, by States, during the year ended Dec. 31, 1939*

State	Number killed					Number injured					Widows	Orphans	Rates per million man-hours					
													Killed			Injured		
	Open quarry	Underground quarry	Shaft or slope	Outside works	Total	Open quarry	Underground quarry	Shaft or slope	Outside works	Total			At quarry	At outside works	Total	At quarry	At outside works	Total
Alabama				1	1	79			58	137	1	1		0.37	0.23	45.72	21.51	30.97
Arizona						6			1	7						18.12	4.95	13.13
Arkansas						22			11	33						130.40	39.19	73.43
California	1	1		2	4	89	43		136	268	4	11	0.96	.44	.61	63.54	30.07	40.61
Colorado	2				2	41	2		10	53	1	3	5.08		2.20	109.23	19.40	58.30
Connecticut	1				1	30			17	47	1		1.72		1.04	51.54	45.14	49.02
Florida	1				1	78			22	100	1	1	1.51		.70	117.99	28.83	70.21
Georgia	2			1	3	44			48	92	2	1	1.42	.52	.90	31.30	24.97	27.65
Idaho						3			4	7						62.71	40.16	47.48
Illinois	2				2	102	5		47	154	2	3	.72		.35	38.44	16.33	27.21
Indiana				4	4	147	6		102	255	4	1		.77	.54	68.46	19.54	34.21
Iowa						25	1		13	39						37.84	5.64	13.04
Kansas						30	6		4	40						44.71	2.36	15.99
Kentucky				1	1	96	14	1	24	135	1			1.06	.43	78.64	25.54	57.42
Maine						33	5		16	54						65.67	23.36	42.74
Maryland	1			2	3	71			10	81	2	2	1.10	2.38	1.71	78.07	11.89	46.27
Massachusetts				1	1	58			47	105	1	1		.74	.42	55.14	34.66	43.61
Michigan						40			27	67						23.05	5.16	9.62
Minnesota	1				1	51			58	109	1	2	1.26		.38	64.22	31.84	41.67
Missouri	2			1	3	194	43		82	319	2	1	.79	.27	.48	93.08	22.09	50.97
Montana						42			3	45						64.21	16.98	54.17
Nebraska						3			2	5						23.86	4.04	8.06
New Hampshire						2			10	12						13.94	41.24	31.09
New Jersey						44			33	77						52.57	28.82	38.85
New York	2				2	92	3		59	154	1		.76		.29	35.97	13.70	22.17
North Carolina						47			20	67						47.81	21.34	34.89
Ohio	2			1	3	110	1		113	224	2	2	.54	.14	.28	29.94	16.31	21.06
Oklahoma						21			13	34						30.30	12.77	19.87
Oregon						58			1	59						141.63	3.14	81.04
Pennsylvania	2	1			3	464	29		252	745	3	9	.35		.12	57.93	15.59	30.19
Rhode Island						16	3		6	25						140.30	35.68	82.35
South Carolina	1				1	73			17	90	1	3	1.77		1.03	128.95	41.84	92.55
South Dakota						25			7	32						66.85	21.89	46.12
Tennessee						205	15		134	354						87.73	39.43	59.93
Texas	2			2	4	21			57	78	3	1	2.74	.67	1.07	28.79	18.99	20.91
Utah						19			14	33						158.51	43.86	75.16
Vermont	3				3	149	35		92	276	1	1	1.17		.61	71.63	39.26	56.19
Virginia	2				2	243	1		119	363	2	6	.66		.31	80.04	35.88	57.03
Washington						88			32	120						92.51	22.93	51.13
West Virginia				1	1	39	13		28	80	1	1		.59	.31	33.29	16.39	24.46
Wisconsin	1				1	122			55	177	1		.79		.45	96.09	56.94	79.18
Wyoming						5	4		20	29						62.08	72.40	68.85
Other States [1]	1				1	18			5	23	1	1	4.57		1.22	82.21	8.36	28.14
Total	29	2		17	48	3,145	229	1	1,829	5,204	39	51	0.56	0.19	0.33	60.45	20.78	36.18

[1] Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 7.—*Hours of employment per man per year worked at various places in quarries, 1939*

State	Average hours of employment per man per year								
	At quarry		At outside works						Total
	Open quarry	Underground quarry	Crusher	Rock-dressing plant	Granules and flour plant	Cement mill	Lime-kiln	Miscellaneous	
Alabama	1,817	1,971	1,874	2,051		1,841	2,125	1,242	1,852
Arizona	2,193		1,212				2,698	2,538	2,203
Arkansas	1,622		1,449		360	1,944	2,468		1,849
California	1,493	2,024	1,635	1,529	1,114	2,307	2,428	1,754	1,876
Colorado	1,446	2,041	1,590	1,778		2,018	2,123	1,914	1,696
Connecticut	1,953		2,059	1,878	2,312		2,056	2,056	1,973
Florida	1,991		1,786	160		1,537	2,527	2,497	1,835
Georgia	1,849	651	1,746	1,632	753	2,126	2,400	1,696	1,781
Idaho	664		600			1,456		2,142	1,003
Illinois	1,423	2,147	1,490	2,000		1,721	2,354	1,299	1,527
Indiana	1,533	1,792	1,548	1,775		2,130	1,740	1,794	1,760
Iowa	1,351	2,007	1,357	1,881		2,104		1,797	1,795
Kansas	1,209	746	1,311	2,218		2,041		2,053	1,607
Kentucky	1,576	1,313	1,651	1,215		2,113	1,682	2,266	1,658
Maine	1,043	1,334	1,640	815		2,325	2,387	2,056	1,163
Maryland	1,887	816	1,790	488	2,651	1,346	1,897	2,141	1,740
Massachusetts	1,691		1,880	1,813	1,788		2,645	2,117	1,838
Michigan	1,710		1,602		1,360	2,329	2,847	2,027	2,024
Minnesota	1,267		699	2,049	1,794	2,184	2,262	2,240	1,655
Missouri	1,145	1,680	1,426	2,353	2,500	2,085	2,283	2,112	1,613
Montana	1,340		2,539	1,233		1,883	2,306		1,435
Nebraska	1,592		1,625			2,143		1,970	1,945
New Hampshire	1,226		465	1,858					1,479
New Jersey	1,726		1,602			1,944	2,084	2,334	1,815
New York	1,582	2,117	1,585	1,772	2,241	1,985	2,290	1,766	1,744
North Carolina	1,851		1,907	1,907			2,190	2,167	1,883
Ohio	1,661	1,802	1,670	2,023		2,300	2,284	2,183	1,930
Oklahoma	1,800		1,656	2,079		2,005	2,748		1,899
Oregon	1,569		763			1,334		2,208	1,411
Pennsylvania	1,767	1,839	1,787	1,953	2,875	1,984	2,025	1,929	1,892
Rhode Island	1,327	2,000	914	1,542			2,352	2,050	1,541
South Carolina	2,097		2,087					2,246	2,100
South Dakota	1,154		1,240	2,087		1,170	2,640	1,029	1,273
Tennessee	1,932	1,675	1,732	2,145	2,700	2,086	2,030	2,114	1,991
Texas	1,650		1,730	2,022		2,082	1,966	1,731	1,914
Utah	1,517		1,548			2,032	1,750	2,165	1,830
Vermont	1,857	2,022	1,809	2,015	1,841		2,103	2,369	1,937
Virginia	1,858	1,572	1,913	2,062	1,752	1,851	2,233	1,912	1,919
Washington	1,631	1,140	1,582	1,921		2,492	2,288	1,310	1,959
West Virginia	1,642	2,145	1,844	942	2,000	1,955	2,480	2,336	1,936
Wisconsin	1,548		1,089	1,531	1,635	2,382	2,558	1,394	1,595
Wyoming	1,072	2,041	1,894			2,089		2,089	1,733
Other States [1]	1,795		1,551			2,470	2,191	1,688	2,107
Total	1,621	1,835	1,653	1,852	2,209	2,055	2,220	1,893	1,811

[1] Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 8.—*All quarries: Fatalities, by causes and States, during the year ended Dec. 31, 1939*

State	Open quarry															Underground quarry										
	Falls or slides of rock or overburden	Handling materials	Hand tools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Stepping on nail	Boiler and air-tank explosions	Burns	Other causes	Total	Fall of rock from roof or wall	Rock while loading at working face or chute	Hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of rock from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		1	2	3	4	5	6	7	8	9	10
Alabama																										
Arizona																										
Arkansas																										
California											1					1							1			
Colorado				2												2	1	1								
Connecticut					1											1		1								
Florida						1										1										
Georgia	1														1	2		2								
Idaho																										
Illinois		1							1							2	2									
Indiana																										
Iowa																										
Kansas																										
Kentucky																										
Maine																										
Maryland	1															1	1									
Massachusetts																										
Michigan																										
Minnesota		1				1										1	1									
Missouri	1															2	2									
Montana																										
Nebraska																										

TABLE 8.—*All quarries: Fatalities, by causes and States, during. the year ended Dec. 31, 1939*—Continued

State	Open quarry													Underground quarry										
	Falls or slides of rock or overburden	Handling materials	Hand tools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Stepping on nail	Boiler and air-tank explosions	Burns	Other causes	Total	Fall of rock from roof or wall	Rock while loading at working face or chute	Hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of rock from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		1	2	3	4	5	6	7	8	9	10
New Hampshire																										
New Jersey																										
New York						1								1		2										
North Carolina																										
Ohio	1										1					2										
Oklahoma																										
Oregon																										
Pennsylvania	1			1												2	1									
Rhode Island																										
South Carolina									1							1										
South Dakota																										
Tennessee																										
Texas					1									1		2										
Utah																										
Vermont	1			1		1										3										
Virginia	2															2										
Washington																										
West Virginia																										
Wisconsin											1					1										
Wyoming																										
Other States [1]															1	1										
Total	8	2		4	2	4			2		3			2	2	29	1						1			

[1] Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 8.—*All quarries: Fatalities, by causes and States, during the year ended Dec. 31, 1939*—Continued

State	Underground quarry—Con.							Shaft or slope							At outside works												
	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock)	Other causes	Total	Falling down shaft or slope	Objects falling down shaft or slope	Breaking of cables	Overwinding	Cage, skip, or bucket	Other causes	Total	Haulage	Machinery	Hand tools	Stepping on nail	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling materials	Burns	Other causes	Total	Grand total
	11	12	13	14	15	16		17	18	19	20	21	22		1	2	3	4	5	6	7	8	9	10	11		
Alabama																				1						1	1
Arizona																											
Arkansas																											
California							1									1					1					2	4
Colorado																											2
Connecticut																											1
Florida																											1
Georgia																1										1	3
Idaho																											
Illinois																				1	1			1	1	4	2 4
Indiana																											
Iowa																											
Kansas																											
Kentucky																									1	1	1
Maine																				1				1		2	3
Maryland																							1			1	1
Massachusetts																											
Michigan																											1
Minnesota																				1						1	3
Missouri																											
Montana																											
Nebraska																											
New Hampshire																											

TABLE 8.—*All quarries: Fatalities, by causes and States, during the year ended Dec. 31, 1939*—Continued

State	Underground quarry—Con.							Shaft or slope							At outside works												
	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock)	Other causes	Total	Falling down shaft or slope	Objects falling down shaft or slope	Breaking of cables	Overwinding	Cage, skip, or bucket	Other causes	Total	Haulage	Machinery	Hand tools	Stepping on nail	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling materials	Burns	Other causes	Total	Grand total
	11	12	13	14	15	16		17	18	19	20	21	22		1	2	3	4	5	6	7	8	9	10	11		
New Jersey																											
New York																											2
North Carolina																											
Ohio																				1					1	1	3
Oklahoma																											
Oregon																											
Pennsylvania							1																				3
Rhode Island																											
South Carolina																											1
South Dakota																											
Tennessee																											
Texas																					1				1	2	4
Utah																											
Vermont																											3
Virginia																											2
Washington																											
West Virginia															1										1	1	1
Wisconsin																											1
Wyoming																											
Other States [1]																											1
Total							2								1	2				5	3		1	2	3	17	48

[1] Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 9.—*All quarries: Injuries, by causes and States, during the year ended Dec. 31, 1939*

State	Open quarry															Underground quarry									
	Falls or slides of rock or overburden	Handling materials	Hand tools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Stepping on nail	Boiler and air-tank explosions	Burns	Other causes	Total	Fall of rock from roof or wall	Rock while loading at working face or chute	Hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of rock from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		1	2	3	4	5	6	7	8	9	10
Alabama	5	20	8	1	12	6	3	10	----	3	8	1	----	----	2	79	----	----	----	----	----	----	----	----	----	----
Arizona	----	4	----	----	----	----	----	1	----	1	----	----	----	----	----	6	----	----	----	----	----	----	----	----	----	----
Arkansas	6	----	8	----	2	----	1	4	----	5	----	----	----	3	8	22	----	----	----	----	----	----	----	----	----	----
California	10	8	7	5	11	13	2	13	----	5	4	----	----	----	----	89	2	10	5	4	1	3	11	----	----	1
Colorado	4	10	----	15	1	2	----	4	----	3	1	----	----	----	1	41	----	----	2	----	----	----	----	----	----	----
Connecticut	----	8	3	----	1	1	----	----	----	1	7	1	----	1	3	30	----	----	----	----	----	----	----	----	----	----
Florida	----	28	3	----	3	14	2	5	3	3	10	2	----	2	3	78	----	----	----	----	----	----	----	----	----	----
Georgia	10	10	2	----	----	3	----	3	----	2	6	----	----	----	7	44	----	----	----	----	----	----	----	----	----	----
Idaho	2	----	----	----	----	----	----	1	----	----	----	----	----	----	----	3	----	----	----	----	----	----	----	----	----	----
Illinois	6	43	1	1	7	11	3	8	----	4	9	1	----	1	7	102	1	4	----	----	----	----	----	----	----	----
Indiana	9	45	2	3	8	14	3	16	----	15	15	1	----	2	14	147	----	4	----	----	----	----	----	----	----	1
Iowa	3	5	2	----	1	1	1	4	----	3	4	----	----	1	----	25	----	----	----	----	----	----	----	----	----	----
Kansas	----	16	----	----	----	----	----	1	1	1	----	----	----	----	9	30	----	5	----	----	----	----	----	----	----	----
Kentucky	4	29	7	2	12	3	5	19	----	5	6	----	----	----	4	96	1	1	1	1	4	----	----	4	----	1
Maine	3	9	1	----	1	4	2	4	----	----	1	----	----	2	6	33	1	----	----	----	----	1	----	1	----	----
Maryland	6	23	13	----	1	5	1	8	----	2	7	----	----	----	5	71	----	----	----	----	----	----	----	----	----	----
Massachusetts	8	17	5	1	2	4	1	5	----	2	2	----	1	----	12	58	----	----	----	----	----	----	----	----	----	----
Michigan	4	7	----	1	5	9	1	5	1	----	3	----	----	1	3	40	----	----	----	----	----	----	----	----	----	----
Minnesota	5	18	2	----	3	7	2	2	----	2	1	1	----	1	9	51	----	----	----	----	----	----	----	6	----	1
Missouri	28	60	5	2	16	9	11	32	----	2	18	----	----	----	11	194	8	8	11	----	4	----	----	----	----	----
Montana	5	11	3	3	2	3	2	9	----	1	2	----	----	----	1	42	----	----	----	----	----	----	----	----	----	----
Nebraska	----	1	----	----	----	----	1	1	----	----	----	----	----	----	----	3	----	----	----	----	----	----	----	----	----	----
New Hampshire	----	2	----	----	----	----	----	----	----	----	----	----	----	----	----	2	----	----	----	----	----	----	----	----	----	----
New Jersey	4	6	6	----	5	3	3	5	----	3	7	----	----	----	2	44	----	----	----	----	----	----	----	----	----	----
New York	7	17	3	1	5	15	5	6	----	5	8	----	----	3	17	92	----	----	2	----	----	----	----	----	----	----

TABLE 9.—*All quarries: Injuries, by causes and States, during the year ended Dec. 31, 1939*—Continued

State	Open quarry																Underground quarry									
	Falls or slides of rock or overburden	Handling materials	Hand tools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Stepping on nail	Boiler and air-tank explosions	Burns	Other causes	Total	Fall of rock from roof or wall	Rock while loading at working face or chute	Hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of rock from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		1	2	3	4	5	6	7	8	9	10
North Carolina	3	18	5		6	2	4	4			2			1	2	47										
Ohio	15	16	3		12	20	3	12	3	5	7		1	3	10	110		1								
Oklahoma	2	10	1		2	1		1			3		1			21										
Oregon	11	6	5		2	5	1	3			15				10	58										
Pennsylvania	28	160	19	2	44	62	17	43	1	21	28	1		5	33	464	3	9	2		2			9		
Rhode Island	3	7	1							1	2				2	16										
South Carolina	6	33			3	2	1	12	1	9	3				3	73										
South Dakota	1	6	7		2		2	3							4	25										
Tennessee	12	28	27		6	30	7	48		12	19	4	1	1	10	205	1	6			4			2		
Texas	2	7	2	1	3	1		3			2					21										
Utah	4	2	1		1			8			1			2		19										
Vermont	7	54	8	3	1	15	14	22		2	11				12	149		2	6	1	2			6		1
Virginia	35	55	10	5	27	21	8	44	1	4	9	2		1	21	243		1								
Washington	15	33	2	1	2	11	7	8		1	4				4	88										
West Virginia	7	6	1	2	3	7		6	1		3				3	39	2		1		1			4		3
Wisconsin	5	42	8	3	1	13	1	21	1	10	3	1		1	12	122										
Wyoming		1	2	2												5		3			1					
Other States[1]	3	4	2		2		1	1	1		3				1	18										
Total	288	885	185	54	215	319	117	405	14	127	234	15	4	32	251	3,145	19	54	30	7	19	4	11	32		7

[1] Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 9.—*All quarries: Injuries, by causes and States, during the year ended Dec. 31, 1939*—Continued

State	Underground quarry—Continued							Shaft or slope							At outside works											Grand total
	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock)	Other causes	Total	Falling down shaft or slope	Objects falling down shaft or slope	Breaking of cables	Overwinding	Cage, skip, or bucket	Other causes	Total	Haulage	Machinery	Hand tools	Stepping on nail	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling materials	Burns	Other causes	Total	
	11	12	13	14	15	16		17	18	19	20	21	22		1	2	3	4	5	6	7	8	9	10	11		
Alabama															2	16	4		1	4	8	7	5	8	3	58	137
Arizona																				1						1	7
Arkansas																2	4					2			3	11	33
California					4	3	43								5	22	19		7	15	8	11	26	11	12	136	268
Colorado							2									4	1			2	3					10	53
Connecticut															1	6		1		1	1	3	1		3	17	47
Florida															2	1	4	1		4	3		4	3		22	100
Georgia															2	3	9			3	5	1	13	5	7	48	92
Idaho																				1		1		2		4	7
Illinois							5								3	16	4	1		6		1	3	1	12	47	154
Indiana						1	6								4	24	7			9	5	12	18	4	19	102	255
Iowa						1	1									4				1		2	5		1	13	39
Kansas						1	6								1	1				2						4	40
Kentucky					1		14		1					1	2	1	3	1	1	2	3	3	4	1	3	24	135
Maine						1	5								1		2				1	6	4		2	16	54
Maryland																1	2			1	1		2		3	10	81
Massachusetts																4	1	1	1	8	9	4	9	4	6	47	105
Michigan															1	3	5		1	5	2	1	6	2	1	27	67
Minnesota															2	10	3				7	13	5	3	15	58	109
Missouri					1	4	43								7	9	6	1		5	10	10	20	7	7	82	319
Montana															1	2										3	45
Nebraska																				1				1		2	5
New Hampshire																1	1			1	2	4			1	10	12
New Jersey															2	7	3			6	3	5	5		2	33	77
New York					1		3								2	10	4	1		8	7	4	12	3	8	59	154
North Carolina															2	5		2		2	1	4	4			20	67
Ohio							1								2	17	3		3	14	17	10	26	10	11	113	224

TABLE 9.—*All quarries: Injuries, by causes and States, during the year ended Dec. 31, 1939*—Continued

State	Underground quarry—Continued							Shaft or slope							At outside works												Grand total
	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock)	Other causes	Total	Falling down shaft or slope	Objects falling down shaft or slope	Breaking of cables	Overwinding	Cage, skip, or bucket	Other causes	Total	Haulage	Machinery	Hand tools	Stepping on nail	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling materials	Burns	Other causes	Total	
	11	12	13	14	15	16		17	18	19	20	21	22		1	2	3	4	5	6	7	8	9	10	11		
Oklahoma																1					2	5	1	4		13	34
Oregon																					1					1	59
Pennsylvania					2	2	29								31	40	20		3	16	20	10	79	9	24	252	745
Rhode Island						3	3								1		2			1		1	1			6	25
South Carolina																2					2	6		2	5	17	90
South Dakota																1	1				1	3	1			7	32
Tennessee						2	15								5	12	11	1		13	3	16	42	13	18	134	354
Texas															2	9	3		2	6	4	11	9	4	7	57	78
Utah															1	4	2			2	2	2			1	14	33
Vermont				1	4	12	35								3	9	20		4	4	10	2	30	6	4	92	276
Virginia							1									25	11	5	4	4	13	14	15	5	23	119	363
Washington															6	4				2		3	10	2	5	32	120
West Virginia						2	13								1	5	1		1	4	4	2	6	2	2	28	80
Wisconsin															1	1	2			2	1	13	14	3	18	55	177
Wyoming							4								1	1	2		1	1	2	3	2	4	3	20	29
Other States [1]																			1	2			2			5	23
Total				1	13	32	229		1					1	94	283	160	15	30	159	161	195	384	119	229	1,829	5,204

[1] Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 10.—*All quarries: Accidents by States and severity of injury, during the year ended Dec. 31, 1939*

State	Killed	Injured				Grand total
		Permanent total [1]	Permanent partial [2]	Temporary [3]	Total nonfatal	
Alabama	1		5	132	137	138
Arizona				7	7	7
Arkansas				33	33	33
California	4		6	262	268	272
Colorado	2		3	50	53	55
Connecticut	1		3	44	47	48
Florida	1	1		99	100	101
Georgia	3		2	90	92	95
Idaho			2	5	7	7
Illinois	2		3	151	154	156
Indiana	4		5	250	255	259
Iowa			3	36	39	39
Kansas			1	39	40	40
Kentucky	1	2	1	132	135	136
Maine				54	54	54
Maryland	3			81	81	84
Massachusetts	1		1	104	105	106
Michigan			5	62	67	67
Minnesota	1		3	106	109	110
Missouri	3		8	311	319	322
Montana			2	43	45	45
Nebraska				5	5	5
New Hampshire				12	12	12
New Jersey				77	77	77
New York	2		20	134	154	156
North Carolina			4	63	67	67
Ohio	3		5	219	224	227
Oklahoma			2	32	34	34
Oregon			4	55	59	59
Pennsylvania	3	1	15	729	745	748
Rhode Island				25	25	25
South Carolina	1			90	90	91
South Dakota				32	32	32
Tennessee			6	348	354	354
Texas	4		4	74	78	82
Utah				33	33	33
Vermont	3	1	5	270	276	279
Virginia	2	2	14	347	363	365
Washington			1	119	120	120
West Virginia	1		4	76	80	81
Wisconsin	1	1	2	174	177	178
Wyoming			2	27	29	29
Other States [4]	1			23	23	24
Total	48	8	141	5,055	5,204	5,252

[1] Permanent total disability: Loss of both legs or arms, 1 leg and 1 arm, total loss of eyesight, paralysis or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[2] Permanent partial disability: Loss of 1 foot, leg, hand, or eye, 1 or more fingers, 1 or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

[3] Disability for more than remainder of day of accident.

[4] Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 11.—*All quarries: Accidents, by causes and severity of injury, during the year ended Dec. 31, 1939*

Cause	Killed	Injured				Grand total
		Permanent total [1]	Permanent partial [2]	Temporary [3]	Total nonfatal	
OPEN QUARRY						
1. Falls or slides of rock or overburden	8		8	280	288	296
2. Handling materials:						
(a) Handling rock at face	1	1	7	700	708	709
(b) Handling other materials	1		2	175	177	178
3. Hand tools			5	180	185	185
4. Explosives:						
(a) Transportation			1		1	1
(b) Charging				3	3	3
(c) Drilling into old holes			1		1	1
(d) Striking in loose rock			1	2	3	3
(e) Thawing	2		2	15	17	19
(f) Caps, detonators, etc			1	3	4	4
(g) Unguarded shots				3	3	3
(h) Returned too soon	1	1		3	4	5
(i) Premature shots	1		1	5	6	7
(j) Delayed blast						
(k) Miscellaneous				12	12	12
5. Haulage:						
(a) Hand and animal		1		47	48	48
(b) Mechanical	1	1	4	83	88	89
(c) Railway cars and locomotives	1		8	71	79	80
6. Falls of persons:						
(a) Falling into quarry from surface benches or face	2		4	60	64	66
(b) Falling from hoists, derricks, ladders, etc	1		1	44	45	46
(c) Miscellaneous	1		1	209	210	211
7. Falling objects (other than 1 and 2)			3	114	117	117
8. Flying objects:						
(a) From sledging		1	10	263	274	274
(b) Others			1	130	131	131
9. Electricity:						
(a) Direct contact with trolley wire				2	2	2
(b) Bar or tool striking trolley wire				1	1	1
(c) Contact with motor	1					1
(d) Others	1			11	11	12
10. Drilling and channeling (by machine or hand)			3	124	127	127
11. Machinery:						
(a) Hoisting cables and attachments	1		1	58	59	60
(b) Guys, cranes, derricks, and attachments		1	1	33	35	35
(c) Pumps and hoisting engines				5	5	5
(d) Power shovels	1		3	51	54	55
(e) Other machinery	1	1	2	78	81	82
12. Stepping on nail				15	15	15
13. Boiler and air-tank explosions				4	4	4
14. Burns	2		1	31	32	34
15. Other causes	2		2	249	251	253
Total, at open quarry	29	7	74	3,064	3,145	3,174
UNDERGROUND						
1. Fall of rock from roof or wall	1		1	18	19	20
2. Rock while loading at working face or chute				54	54	54
3. Hand tools				30	30	30
4. Explosives		1		6	7	7
5. Haulage			3	16	19	19

[1] Permanent total disability: Loss of both legs or arms, 1 leg and 1 arm, total loss of eyesight, paralysis or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[2] Permanent partial disability: Loss of 1 foot, leg, hand, or eye, 1 or more fingers, 1 or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

[3] Disability for more than remainder of day of accident.

TABLE 11.—*All quarries: Accidents, by causes and severity of injury, during the year ended Dec. 31, 1939*—Continued

Cause	Killed	Injured				Grand total
		Permanent total	Permanent partial	Temporary	Total nonfatal	
UNDERGROUND—continued						
6. Falling down chute, winze, raise, or stope				4	4	4
7. Run of rock from chute or pocket	1			11	11	12
8. Drilling			1	31	32	32
9. Electricity						
10. Machinery (other than locomotives or drills)			1	6	7	7
11. Mine fires						
12. Suffocation from natural gases						
13. Inrush of water						
14. Stepping on nail				1	1	1
15. Handling materials (other than rock)				13	13	13
16. Other causes				32	32	32
Total, at underground quarry	2	1	6	222	229	231
SHAFT OR SLOPE						
17. Falling down shaft or slope						
18. Objects falling down shaft or slope				1	1	1
19. Breaking of cables						
20. Overwinding						
21. Cage, skip, or bucket						
22. Other causes						
Total, in shaft or slope				1	1	1
OUTSIDE WORKS						
1. Haulage:						
(*a*) Hand and animal				32	32	32
(*b*) Mechanical				34	34	34
(*c*) Railway cars and locomotives	1		1	27	28	29
2. Machinery:						
(*a*) Hoisting cables and attachments			5	30	35	35
(*b*) Guys, cranes, derricks, and attachments			5	28	33	33
(*c*) Pumps and hoisting engines			1	2	3	3
(*d*) Crushers			4	46	50	50
(*e*) Other machinery	2		17	145	162	164
3. Hand tools			1	159	160	160
4. Stepping on nail				15	15	15
5. Electricity:						
(*a*) Direct contact with trolley wire						
(*b*) Bar or tool striking trolley wire						
(*c*) Contact with motor				2	2	2
(*d*) Others			1	27	28	28
6. Falls of persons	5		4	155	159	164
7. Falling objects (rocks, timbers, etc.)	3		1	160	161	164
8. Flying objects:						
(*a*) From sledging			5	65	70	70
(*b*) From crushing				14	14	14
(*c*) Others			1	110	111	111
9. Handling materials:						
(*a*) Handling rock by hand			5	222	227	227
(*b*) Handling other materials	1		5	152	157	158
10. Burns	2		3	116	119	121
11. Other causes	3		2	227	229	232
Total, at outside works	17		61	1,768	1,829	1,846
Grand total	48	8	141	5,055	5,204	5,252

TABLE 12.—*All quarries: Causes of fatalities and injuries, showing percentage due to each cause and corresponding rates per million man-hours, during the year ended Dec. 31, 1939*

Cause of accident	Fatalities				Nonfatal injuries			
	Percent of—		Per million man-hours		Percent of—		Per million man-hours	
	Grand total	Class total	Grand total	Class total	Grand total	Class total	Grand total	Class total
	1	2	3	4	5	6	7	8
Open quarry:								
1. Falls or slides of rock or overburden	16.66	27.58	0.055	0.157	5.53	9.16	2.002	5.642
2. Handling materials	4.17	6.90	.014	.039	17.01	28.14	6.152	17.338
3. Hand tools					3.55	5.88	1.286	3.624
4. Explosives	8.33	13.79	.028	.078	1.04	1.72	.375	1.058
5. Haulage	4.17	6.90	.014	.039	4.13	6.84	1.495	4.212
6. Falls of persons	8.33	13.79	.028	.078	6.13	10.14	2.218	6.250
7. Falling objects (other than 1 and 2)					2.25	3.72	.813	2.292
8. Flying objects					7.78	12.88	2.816	7.935
9. Electricity	4.17	6.90	.014	.039	.27	.44	.097	.274
10. Drilling and channeling (by machine or hand)					2.44	4.04	.883	2.488
11. Machinery	6.25	10.34	.021	.059	4.50	7.44	1.627	4.584
12. Stepping on nail					.29	.47	.104	.294
13. Boiler and air-tank explosions					.08	.13	.028	.078
14. Burns	4.17	6.90	.014	.039	.61	1.02	.222	.627
15. Other causes	4.17	6.90	.014	.039	4.82	7.98	1.745	4.918
Total	60.42	100.00	.202	.568	60.43	100.00	21.863	61.614
Underground quarry:								
1. Fall of rock from roof or wall	2.08	50.00	.007	.209	.37	8.30	.132	3.966
2. Rock while loading at working face or chute					1.04	23.58	.375	11.272
3. Hand tools					.58	13.10	.209	6.262
4. Explosives					.13	3.06	.049	1.461
5. Haulage					.37	8.30	.132	3.966
6. Falling down chute, winze, raise, or stope					.08	1.75	.028	.835
7. Run of rock from chute or pocket	2.08	50.00	.007	.209	.21	4.80	.077	2.296
8. Drilling					.61	13.97	.222	6.679
9. Electricity								
10. Machinery (other than locomotives or drills)					.13	3.06	.049	1.461
11. Mine fires								
12. Suffocation from natural gases								
13. Inrush of water								
14. Stepping on nail					.02	.43	.007	.209
15. Handling materials (other than rock)					.25	5.68	.090	2.713
16. Other causes					.61	13.97	.222	6.679
Total underground (excluding shaft)	4.16	100.00	.014	.417	4.40	100.00	1.592	47.799
Shaft or slope:								
17. Falling down shaft or slope								
18. Objects falling down shaft or slope					.02	100.00	.007	.209
19. Breaking of cables								
20. Overwinding								
21. Cage, skip, or bucket								
22. Other causes								
Total shaft					.02	100.00	.007	.209

TABLE 12.—*All quarries: Causes of fatalities and injuries, showing percentage due to each cause and corresponding rates per million man-hours, during the year ended Dec. 31, 1939*—Continued

Cause of accident	Fatalities				Nonfatal injuries			
	Percent of—		Per million man-hours		Percent of—		Per million man-hours	
	Grand total	Class total	Grand total	Class total	Grand total	Class total	Grand total	Class total
	1	2	3	4	5	6	7	8
At outside works:								
1. Haulage	2.08	5.88	.007	.011	1.81	5.14	.654	1.068
2. Machinery	4.17	11.76	.014	.023	5.44	15.47	1.967	3.215
3. Hand tools					3.07	8.75	1.112	1.818
4. Stepping on nail					.29	.82	.104	.170
5. Electricity					.58	1.64	.209	.341
6. Falls of persons	10.42	29.41	.034	.057	3.05	8.69	1.105	1.807
7. Falling objects (rocks, timbers, etc.)	6.25	17.65	.021	.034	3.09	8.80	1.119	1.829
8. Flying objects					3.75	10.66	1.356	2.216
9. Handling materials	2.08	5.88	.007	.011	7.38	21.00	2.670	4.363
10. Burns	4.17	11.76	.014	.023	2.29	6.51	.827	1.352
11. Other causes	6.25	17.65	.021	.034	4.40	12.52	1.592	2.602
Total	35.42	100.00	.118	.193	35.15	100.00	12.715	20.781
Grand total	100.00		.334		100.00		36.177	

ACCIDENTS AT DIFFERENT KINDS OF QUARRIES

Cement rock.—Although the number of men employed in the cement industry increased but slightly in 1939, the volume of labor performed increased more decidedly as measured by the total number of man-hours worked. The increase in man-hours worked was due to a longer workyear in 1939 than in 1938. In spite of increased employment, there were fewer accidents, thus the accident-frequency rate for 1939 indicated an improvement over that for 1938. Reports from operating companies showed that the improvement in safety was due to a reduction in accidents at underground quarries, as an increase was reported in the accident rate for open quarries.

In 1939, as in previous years, the cement industry led all other quarrying groups by establishing the lowest accident-frequency rate per million man-hours of exposure to risk. (See tables 13 to 17 and table 26.)

The industry employed 26,045 men who worked an average of 272 days per man; the total volume of work was slightly more than 52 million man-hours. Twelve men were killed and 457 injured by accidents during the year. The number of plants in operation was 178. Operations at the cement mills were conducted with a much more favorable accident-frequency rate than those inside the quarry pits.

Granite.—Reports for granite quarries showed that 294 plants were in operation during 1939. Employment was at virtually the same level as in 1938. The number of employees working in 1939 was

8,390, and their total working time was slightly more than 14 million man-hours. The plants were in operation an average of 222 workdays per man. A notable reduction was reported in the number of fatal accidents, however, as only 8 men were killed in 1939 compared with 25 in 1938. Nonfatal injuries increased in number. The accident-frequency rate for both fatal and nonfatal injuries was 42.98 per million man-hours worked. The corresponding rate for 1938 was 42.93. A classification of the reports from operating companies showed an accident rate of 49.49 for quarrying work proper and a rate of 34.29 for finishing plants and other works outside the quarries.

The leading States in number of employees were California, North Carolina, and Georgia.

Limestone.—This group includes all limestone quarries except those producing stone to be used for the manufacture of cement or lime. Reports showed that 948 quarries were active part or all of 1939. Both the number of workers and the total number of man-hours worked improved in 1939. The number of accidents reported also improved, as a decrease of 8 fatalities and 149 nonfatal injuries were shown by reports from the operating companies. The number of workdays per employee gained in 1939, averaging 193 days per man, compared with 187 days per man in 1938. The leading States in number of employees were Pennsylvania, Indiana, and Illinois.

Employees numbered 22,968 men in 1939. The working time for all employees totaled nearly 36 million man-hours. Accidents resulted in 14 deaths and 1,743 nonfatal injuries.

Limestone (chief product, lime).—This group covers all limestone quarries that produced stone entirely or chiefly for use in the manufacture of lime. Active plants totaled 243 and employed 9,632 men who performed 20 million man-hours of work. These figures indicate gains over 1938. A gain was also reported in the number of workdays per man, as the average employee worked 281 days in 1939 compared with 260 days in 1938. Fewer fatalities but a larger number of nonfatal injuries were reported in 1939; however, the number of accidents improved slightly in relation to the total volume of employment, as the accident rate for 1939 was only 49.59 per million man-hours of exposure to risk compared with 52.51 per million man-hours in 1938. The States having the lowest rates were Pennsylvania and Ohio.

Marble.—Employment increased at marble quarries in 1939. More men were employed and more man-hours of labor performed during the year. Working time per employee averaged 236 days in 1939 compared with 234 days in 1938. Employees at all plants numbered 3,697, who worked a total of 7 million man-hours. No fatal accidents occurred, but 429 employees suffered nonfatal injuries. The accident-frequency rate of 60.91 per million man-hours of exposure did not compare favorably with the 1938 rate of 58.39. The increase was due primarily to an increase in accidents inside the quarries caused by falls of persons and by flying objects. Tennessee and Vermont reported the largest number of employees.

Sandstone.—The sandstone industry reported gains both in number of employees and number of man-hours worked in 1939; 182 plants were active, 3,113 men were employed, and 4.8 million man-hours of labor were performed. No fatal accidents occurred during the year.

Nonfatal injuries numbered 313 and resulted in an accident-frequency rate of 65.31 compared with 58.15 in 1938. Chiefly responsible for the rise in the accident rate were increases in accidents inside the quarries due to falls or slides of rock or overburden, falls of persons, and hand tools. States having the largest number of employees at sandstone quarries were Pennsylvania and Ohio.

Slate.—Slate quarrying was reported at 87 properties in 1939, and the total number of employees and man-hours worked increased. Reports from operating companies showed a working force of 2,833 men and a total of 5.3 million man-hours worked. The plants were active for a much longer period in 1939 than in 1938, as the average working period was 227 days per employee, a gain of 32 days per man over 1938. Three fatalities occurred, and 376 men were injured by accidents in 1939. These figures compared unfavorably with the safety record of 1938. The combined fatality and injury rate for 1939 was 70.98 per million man-hours worked; the corresponding rate for 1938 was 57.04. The principal classes of accidents responsible for the higher rate in 1939 were falls of persons, flying objects, hand tools, and falling objects. Pennsylvania reported for more than half the total number of employees at all slate quarries.

Trap rock.—Contrary to most other groups of quarrying operations, the trap-rock industry reported declines in employment in 1939. Fewer men were employed, and fewer man-hours were worked; however, the average number of workdays per employee increased. Reports from operating companies showed that 2,771 men were employed for an average of 187 workdays per man and that the working time of all employees totaled 4.2 million man-hours. Active plants numbered 138. Four men were killed by accidents, and 275 employees suffered nonfatal injuries. The accident-frequency rate was 65.95 per million man-hours, or slightly more than the rate of 62.85 per million man-hours in 1938. Although the change in the over-all rate was not large, a more significant increase was shown in the accident-frequency rate among workers inside the quarry pits. Higher accident rates among employees of this class were caused by increases in accidents due to machinery, hand tools, and haulage equipment. The States in which employment was largest at trap-rock quarries during 1939 were New Jersey, Massachusetts, and Washington.

TABLE 13.—*All quarries: Men employed, man-days, man-hours of employment, and number killed and injured, by kind of quarry, during the year ended Dec. 31, 1939*

Kind of quarry	Number of quarries [1]	Men employed			Man-days of employment			Average hours of employment per man per day			Man-hours of employment		
		At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
Cement rock [2]	178	3,796	22,249	26,045	889,510	6,202,091	7,091,601	7.59	7.30	7.33	6,752,394	45,252,020	52,004,414
Granite	294	4,934	3,456	8,390	1,072,951	791,998	1,864,949	7.63	7.73	7.67	8,184,598	6,124,950	14,309,548
Limestone	948	14,947	8,021	22,968	2,798,005	1,631,368	4,429,373	8.02	8.16	8.07	22,431,234	13,308,589	35,739,823
Limestone (chief product, lime)	243	3,828	5,804	9,632	1,036,899	1,673,846	2,710,745	7.46	7.56	7.52	7,731,031	12,655,429	20,386,460
Marble	58	1,389	2,308	3,697	311,390	562,490	873,880	8.16	8.00	8.06	2,541,353	4,502,326	7,043,679
Sandstone	182	2,221	892	3,113	407,347	186,587	593,934	8.05	8.12	8.07	3,277,429	1,515,388	4,792,817
Slate	87	1,143	1,690	2,833	253,702	390,498	644,200	8.38	8.23	8.29	2,125,900	3,213,225	5,339,125
Trap rock	138	1,842	929	2,771	344,609	172,789	517,398	8.10	8.33	8.18	2,790,845	1,439,872	4,230,717
Total	2,128	34,100	45,349	79,449	7,114,413	11,611,667	18,726,080	7.85	7.58	7.68	55,834,784	88,011,799	143,846,583

Kind of quarry	Average days of employment per man			Average hours per man per year			Number killed			Number injured			Widows	Orphans	Rates per million man-hours					
															Killed			Injured		
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total			At quarry	At outside works	Total	At quarry	At outside works	Total
Cement rocks [2]	234	279	272	1,779	2,034	1,997	4	8	12	142	315	457	10	16	0.59	0.18	0.23	21.03	6.96	8.79
Granite	217	229	222	1,659	1,772	1,706	8	-------	8	397	210	607	6	6	.98	-------	.56	48.51	34.29	42.42
Limestone	187	203	193	1,501	1,659	1,556	8	6	14	1,387	356	1,743	12	15	.36	.45	.39	61.83	26.75	48.77
Limestone (chief product, lime)	271	288	281	2,020	2,180	2,117	5	2	7	543	461	1,004	6	12	.65	.16	.34	70.24	36.43	49.25
Marble	224	244	236	1,830	1,951	1,905	-------	-------	-------	228	201	429	-------	-------	-------	-------	-------	89.72	44.64	60.91
Sandstone	183	209	191	1,476	1,699	1,540	-------	-------	-------	257	56	313	-------	-------	-------	-------	-------	78.42	36.95	65.31
Slate	222	231	227	1,860	1,901	1,885	3	-------	3	186	190	376	1	1	1.41	-------	.56	87.49	59.13	70.42
Trap rock	187	186	187	1,515	1,550	1,527	3	1	4	235	40	275	4	1	1.07	.69	.95	84.20	27.78	65.00
Total	209	256	236	1,637	1,941	1,811	31	17	48	3,375	1,829	5,204	39	51	0.56	0.19	0.33	60.45	20.78	36.18

[1] Includes a small number of mills or other plants not operated in connection with quarries.

[2] Includes limestone or other stone used in the manufacture of cement.

TABLE 14.—*All quarries: Fatalities and injuries, by causes and kind of quarry, during the year ended Dec. 31, 1939*

Kind of quarry	Open quarry																Underground quarry									
	Falls or slides of rock or overburden	Handling materials	Hand tools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Stepping on nail	Boiler and air-tank explosions	Burns	Other causes	Total	Fall of rock from roof or wall	Rock while loading at working face or chute	Hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of rock from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		1	2	3	4	5	6	7	8	9	10
Killed:																										
Cement rock [1]				2					1							3							1			
Granite	1	1			1	1			1		2				1	8										
Limestone	3	1		1		2									1	8										
Limestone (chief product, lime)	2										1			1		4	1									
Marble																										
Sandstone																										
Slate	1			1		1										3										
Trap rock	1				1									1		3										
Total	8	2		4	2	4			2		3			2	2	29	1						1			
Injured:																										
Cement rock [1]	14	22	4	18	12	8	1	3		7	9			1	5	104	3	8	3	4	3	1	8	3		1
Granite	46	89	25	4	12	39	21	51	3	19	36	5		4	40	394										
Limestone	101	409	63	21	84	125	39	190	6	54	98	7	3	16	76	1,292	6	24	13	1	9	2	3	14		5
Limestone (chief product, lime)	53	176	17	4	63	34	13	57	4	19	16			4	35	495	8	19	5		5			8		
Marble	7	15	23		8	34	13	43		14	19	3			12	191		2	8	1	2			6		1
Sandstone	30	63	22	1	12	36	9	21		3	21			3	35	256										
Slate	9	58	16	3	14	23	11	15		3	5				23	180	1		1	1		1		1		
Trap rock	28	53	15	3	10	20	10	25	1	8	30		1	4	25	233	1	1								
Total	288	885	185	54	215	319	117	405	14	127	234	15	4	32	251	3,145	19	54	30	7	19	4	11	32		7

[1] Includes limestone or other stone used in the manufacture of cement.

TABLE 14.—*All quarries: Fatalities and injuries, by causes and kind of quarry, during the year ended Dec. 31, 1939*—Continued

Kind of quarry	Underground quarry—Continued							Shaft or slope							At outside works												Grand total
	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock)	Other causes	Total	Falling down shaft or slope	Objects falling down shaft or slope	Breaking of cables	Overwinding	Cage, skip, or bucket	Other causes	Total	Haulage	Machinery	Hand tools	Stepping on nail	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling materials	Burns	Other causes	Total	
	11	12	13	14	15	16		17	18	19	20	21	22		1	2	3	4	5	6	7	8	9	10	11		
Killed:																											
Cement rock [1]							1									2				1	2			1	2	8	12
Granite																											8
Limestone															1					3	1				1	6	14
Limestone (chief product, lime)							1													1				1		2	7
Marble																											
Sandstone																											
Slate																											3
Trap rock																							1			1	4
Total							2								1	2				5	3		1	2	3	17	48
Injured:																											
Cement rock [1]					2	2	38								19	66	20	1	11	43	28	25	42	33	27	315	457
Granite						3	3									25	26	8		9	16	54	19	7	46	210	607
Limestone					6	11	94		1					1	14	89	33	3	7	32	32	30	65	10	41	356	1,743
Limestone (chief product, lime)					1	2	48								25	41	32	2	8	42	36	44	95	60	76	461	1,004
Marble				1	4	12	37								7	29	15	1		15	25	18	74	4	13	201	429
Sandstone						1	1								3	10	8		1	3	7	6	12	2	4	56	313
Slate						1	6								23	12	22		3	12	15	11	75	2	15	190	376
Trap rock							2								3	11	4			3	2	7	2	1	7	40	275
Total				1	13	32	229		1					1	94	283	160	15	30	159	161	195	384	119	229	1,829	5,204

[1] Includes limestone or other stone used in the manufacture of cement.

TABLE 15.—*All quarries: Fatalities and injuries, classified by kind of quarry and severity of injury, during the year ended Dec. 31, 1939*

[No accidents occurred in classes of quarries not listed]

Open quarry

Kind of quarry and severity of injury	1 Falls or slides of rock or overburden	2 Handling materials (a) Handling rock at face	2 (b) Handling other materials	3 Hand tools	4 Explosives (a) Transportation	4 (b) Charging	4 (c) Drilling into old holes	4 (d) Striking in loose rock	4 (e) Thawing	4 (f) Caps, detonators, etc.	4 (g) Unguarded shots	4 (h) Returned too soon	4 (i) Premature shots	4 (j) Delayed blast	4 (k) Miscellaneous	5 Haulage (a) Hand and animal	5 (b) Mechanical	5 (c) Railway cars and locomotives	6 Falls of persons (a) Falling into quarry from surface, benches, or face	6 (b) Falling from hoists, derricks, ladders, etc.	6 (c) Miscellaneous	7 Falling objects (other than 1 and 2)	8 Flying objects (a) From sledging	8 (b) Others	9 Electricity (a) Direct contact with trolley wire	9 (b) Bar or tool striking trolley wire	9 (c) Contact with motor	9 (d) Others	10 Drilling and channeling (by machine or hand)	11 Machinery (a) Hoisting cables and attachments	11 (b) Guys, cranes, derricks, and attachments	11 (c) Pumps and hoisting engines	11 (d) Power shovels	11 (e) Othrr machinery	12 Stepping on nail	13 Boiler and air-tank explosions	14 Burns	15 Other causes	Total in and about quarry, 1939
Killed:																																							
Cement rock [1]									2																			1											3
Granite	1	1																1	1								1						1	1				1	8
Limestone	3		1									1							1	1																		1	8
Limestone (chief product, lime)	2																													1							1		4
Slate	1												1								1																		3
Trap rock	1																1																				1		3
Total	8	1	1						2			1	1				1	1	2	1	1						1	1		1			1	1			2	2	29
Permanent total: [2]																																							
Granite		1																					1								1								3
Limestone												1				1	1																	1					4
Total		1										1				1	1						1								1			1					7

See footnotes at end of table.

TABLE 15.—*All quarries: Fatalities and injuries, classified by kind of quarry and severity of injury, during the year ended Dec. 31, 1939*—Con.

Kind of quarry and severity of injury	Open quarry: 1. Falls or slides of rock or overburden	2. Handling materials: (a) Handling rock at face	2. (b) Handling other materials	3. Hand tools	4. Explosives: (a) Transportation	4. (b) Charging	4. (c) Drilling into old holes	4. (d) Striking in loose rock	4. (e) Thawing	4. (f) Caps, detonators, etc.	4. (g) Unguarded shots	4. (h) Returned too soon	4. (i) Premature shots	4. (j) Delayed blast	4. (k) Miscellaneous	5. Haulage: (a) Hand and animal	5. (b) Mechanical	5. (c) Railway cars and locomotives	6. Falls of persons: (a) Falling into quarry from surface, benches, or face	6. (b) Falling from hoists, derricks, ladders, etc.	6. (c) Miscellaneous	7. Falling objects (other than 1 and 2)	8. Flying objects: (a) From sledging	8. (b) Others	9. Electricity: (a) Direct contact with trolley wire	9. (b) Bar or tool striking trolley wire	9. (c) Contact with motor	9. (d) Others	10. Drilling and channeling (by machine or hand)	11. Machinery: (a) Hoisting cables and attachments	11. (b) Guys, cranes, derricks, and attachments	11. (c) Pumps and hoisting engines	11. (d) Power shovels	11. (e) Other machinery	12. Stepping on nail	13. Boiler and air-tank explosions	14. Burns	15. Other causes	Total in and about quarry, 1939
Permanent partial: [3]																																							
Cement rock [1]	1		1	1	1				2									1	1			1							2				1						12
Granite	1	2		1														1					1																6
Limestone	3	5		2			1	1		1			1				2	2	1	1		2	5	1					1		1		1					1	32
Limestone (chief product, lime)	1																2	3					3															1	10
Marble																														1				1					2
Sandstone	1																		1				1																3
Slate																			1															1					2
Trap rock	1		1	1														1			1												1				1		7
Total	8	7	2	5	1		1	1	2	1			1				4	8	4	1	1	3	10	1					3	1	1		3	2			1	2	74

Temporary: [4]																																						
Cement rock [1]	13	15	6	3					12			2			1		3	8	1		6		2	1					5	2		1	3	2			1	5	92
Granite	45	70	16	24				1			2	1				1	4	6	9	5	25	21	33	16				3	19	6	7	2	10	10	5		4	40	385
Limestone	98	317	87	61				1	3	2	1		2		7	16	45	17	21	20	82	37	135	49	1	1		4	53	24	12	1	19	39	7	3	16	75	1,256
Limestone (chief product, lime)	52	141	35	17		1									3	19	15	24	11	3	20	13	43	11	1			3	19	8		1	2	5			4	34	485
Marble	7	7	8	23												4	4		4	7	23	13	20	23					14	11	3			3	3			12	189
Sandstone	29	52	11	22									1				3	9	5	6	24	9	14	6					3	1	8		6	6			3	35	253
Slate	9	53	5	16		1							2		7		5	2	4	1	17	11	10	5					3	1	1			2				23	178
Trap rock	27	45	7	14		1				1					1		4	5	5	2	12	10	6	19				1	8	5	2		11	11		1	3	25	226
Total	280	700	175	180		3		2	15	3	3	3	5		12	47	83	71	60	44	209	114	263	130	2	1		11	124	58	33	5	51	78	15	4	31	249	3,064
All quarries:																																							
Killed	8	1	1						2			1	1				1	1	2	1	1							1	1		1			1	1			2	2	29
Permanent total [2]		1										1				1	1						1							1			1					7
Permanent partial [3]	8	7	2	5	1		1	1	2	1			1				4	8	4	1	1	3	10	1					3	1	1		3	2			1	2	74
Temporary [4]	280	700	175	180		3		2	15	3	3	3	5		12	47	83	71	60	44	209	114	263	130	2	1		11	124	58	33	5	51	78	15	4	31	249	3,064
Total, nonfatal	288	708	177	185	1	3	1	3	17	4	3	4	6		12	48	88	79	64	45	210	117	274	131	2	1		11	127	59	35	5	54	81	15	4	32	251	3,145

[1] Includes limestone or other stone used in the manufacture of cement.

[2] Permanent total disability: Loss of both legs or arms, 1 leg and 1 arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[3] Permanent partial disability: Loss of 1 foot, leg, hand, or eye, 1 or more fingers, 1 or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

[4] Disability for more than remainder of day of accident.

TABLE 15.—*All quarries: Fatalities and injuries, classified by kind of quarry and severity of injury, during the year ended Dec. 31, 1939*—Con.

Kind of quarry and severity of injury	Underground quarry																Shaft or slope						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		17	18	19	20	21	22	
	Fall of rock from roof or wall	Rock while loading at working face or chute	Hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of rock from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock)	Other causes	Total	Falling down shaft or slope	Objects falling down shaft or slope	Breaking of cables	Overwinding	Cage, skip, or bucket	Other causes	Total
Killed:																								
Cement rock [1]							1										1							
Granite																								
Limestone																								
Limestone (chief product, lime)	1																1							
Slate																								
Trap rock																								
Total	1						1										2							
Permanent total: [2]																								
Granite																								
Limestone				1													1							
Total				1													1							
Permanent partial: [3]																								
Cement rock [1]																								
Granite																								
Limestone					1					1							2							
Limestone (chief product, lime)	1				1												2							
Marble					1			1									2							
Sandstone																								
Slate																								
Trap rock																								
Total	1				3			1		1							6							

Temporary: [4]																								
Cement rock [1]	3	8	3	4	3	1	8	3		1					2	2	38							
Granite																3	3							
Limestone	6	24	13		8	2	3	14		4					6	11	91		1					1
Limestone (chief product, lime)	7	19	5		4			8							1	2	46							
Marble		2	8	1	1			5		1				1	4	12	35							
Sandstone																1	1							
Slate	1		1	1		1		1								1	6							
Trap rock	1	1															2							
Total	18	54	30	6	16	4	11	31		6				1	13	32	222		1					1
All quarries:																								
Killed	1						1										2							1
Permanent total [2]				1													1							
Permanent partial [3]	1				3			1		1							6							
Temporary [4]	18	54	30	6	16	4	11	31		6				1	13	32	222		1					1
Total, nonfatal	19	54	30	7	19	4	11	32		7				1	13	32	229		1					1

[1] Includes limestone or other stone used in the manufacture of cement.

[2] Permanent total disability: Loss of both legs or arms, 1 leg and 1 arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[3] Permanent partial disability: Loss of 1 foot, leg, hand, or eye, 1 or more fingers, 1 or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

[4] Disability for more than remainder of day of accident.

TABLE 15.—*All quarries: Fatalities and injuries, classified by kind of quarry and severity of injury, during the year ended Dec. 31, 1939*—Con.

Kind of quarry and severity of injury	At outside works																												
	1			2						3	4	5				6	7	8			9		10	11		
	Haulage			Machinery								Electricity						Flying objects			Handling materials					
	(a) Hand and animal	(b) Mechanical	(c) Railway cars and locomotives	(a) Hoisting cables and attachments	(b) Guys, cranes, derricks, and attachments	(c) Pumps and hoisting engines	(d) Crushers	(e) Other machinery	Hand tools	Stepping on nail	(a) Direct contact with trolley wire	(b) Bar or tool striking trolley wire	(c) Contact with motor	(d) Others	Falls of persons	Falling objects (rocks, timbers, etc.)	(a) From sledging	(b) From crushing	(c) Others	(a) Handling rock by hand	(b) Handling other materials	Burns	Other causes	Total outside works, 1939	Grand total
Killed:																													
Cement rock [1]								2							1	2						1	2	8	12
Granite																									8
Limestone			1												3	1							1	6	14
Limestone (chief product, lime)															1							1		2	7
Slate																									3
Trap rock																					1			1	4
Total			1					2							5	3					1	2	3	17	48
Permanent total [2]																									
Granite																									3
Limestone																									5
Total																									8
Permanent partial: [3]																									
Cement rock [1]			1	3	3	1	2	6						1	2	1	2				1	1		24	36
Granite					1			1									1			1		1		5	11
Limestone				1			1	6							2		1				3	1	1	16	50

Limestone (chief product, lime)																							1	1	13
Marble				1	1			3											2	1				8	12
Sandstone																		1						1	4
Slate									1								1		2					4	6
Trap rock							1	1																2	9
Total			1	5	5	1	4	17	1				1	4	1	5		1	5	5	3	2	61	141
Temporary: [4]																									
Cement rock [1]	3	5	10	6	3		3	39	20	1			1	9	41	27	2		21	6	35	32	27	291	421
Granite				2	3	1	10	7	26	8					9	16	30	2	21	15	3	6	46	205	593
Limestone	2	8	4	12	13		15	41	33	3				7	30	32	9	1	19	37	25	9	40	340	1,688
Limestone (chief product, lime)	13	10	2	7	4		8	22	32	2			1	7	42	36	8	8	28	23	72	60	75	460	991
Marble	1	6		2	3		4	15	15	1					15	25	6		12	60	11	4	13	193	417
Sandstone	1	1	1		1		2	7	8					1	3	7		1	4	10	2	2	4	55	309
Slate	12	2	9	1	1	1		9	21					3	12	15	8		2	71	2	2	15	186	370
Trap rock		2	1				4	5	4						3	2	2	2	3		2	1	7	38	266
Total	32	34	27	30	28	2	46	145	159	15			2	27	155	160	65	14	110	222	152	116	227	1,768	5,055
All quarries:																									
Killed			1					2							5	3					1	2	3	17	48
Permanent total [2]																									8
Permanent partial [3]			1	5	5	1	4	17	1					1	4	1	5		1	5	5	3	2	61	141
Temporary [4]	32	34	27	30	28	2	46	145	159	15			2	27	155	160	65	14	110	222	152	116	227	1,768	5,055
Total, nonfatal	32	34	28	35	33	3	50	162	160	15			2	28	159	161	70	14	111	227	157	119	229	1,829	5,204

[1] Includes limestone or other stone used in the manufacture of cement.

[2] Permanent total disability: Loss of both legs or arms, 1 leg and 1 arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[3] Permanent partial disability: Loss of 1 foot, leg, hand, or eye, 1 or more fingers, 1 or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

[4] Disability for more than remainder of day of accident.

TABLE 16.—*Cement-rock,[1] marble, slate, and trap-rock quarries: Men employed and man-days, by States, during the year ended Dec. 31, 1939*

State	Number of quarries [2]	Men employed			Man-days of employment			Average days of employment per man		
		At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
Cement rock: [1]										
Alabama	11	227	868	1,095	48,593	227,177	275,770	214	262	252
California	11	302	1,426	1,728	76,055	421,351	497,406	252	295	288
Illinois	6	152	1,057	1,209	36,818	266,165	302,983	242	252	251
Indiana	5	86	1,063	1,149	20,139	308,743	328,882	234	290	286
Iowa	5	147	1,048	1,195	31,936	281,899	313,835	217	269	263
Kansas	8	129	732	861	29,763	191,635	221,398	231	262	257
Michigan	10	60	1,655	1,715	11,352	487,704	499,056	189	295	291
Missouri	5	186	862	1,048	36,944	254,979	291,923	199	296	279
New York	14	282	1,390	1,672	64,696	361,694	426,390	229	260	255
Ohio	11	204	1,179	1,383	45,740	346,778	392,518	224	294	284
Pennsylvania	30	765	4,612	5,377	182,340	1,336,548	1,518,888	238	290	282
Tennessee	6	123	601	724	29,249	166,821	196,070	238	278	271
Texas	11	123	1,165	1,288	27,691	318,760	346,451	225	274	269
Virginia	3	141	332	473	30,479	90,559	121,038	216	273	256
Washington	6	127	451	578	29,753	146,539	176,292	234	325	305
West Virginia	3	186	326	512	51,276	87,047	138,323	276	267	270
Other States [3]	33	556	3,482	4,038	136,686	907,692	1,044,378	246	261	259
Total	178	3,796	22,249	26,045	889,510	6,202,091	7,091,601	234	279	272
Marble:										
Missouri	4	77	130	207	15,920	38,950	54,870	207	300	265
Tennessee	16	717	569	1,286	177,749	151,001	328,750	248	265	256
Vermont	6	298	768	1,066	74,141	195,735	269,876	249	255	253
Other States [4]	32	297	841	1,138	43,580	176,804	220,384	147	210	194
Total	58	1,389	2,308	3,697	311,390	562,490	873,880	224	244	236
Slate:										
New York	6	39	34	73	5,706	6,697	12,403	146	197	170
Pennsylvania	29	485	994	1,479	111,927	241,194	353,121	231	243	239
Vermont	36	404	224	628	94,740	48,855	143,595	235	218	229
Virginia	6	110	305	415	25,359	71,189	96,548	231	233	233
Other States [5]	10	105	133	238	15,970	22,563	38,533	152	170	162
Total	87	1,143	1,690	2,833	253,702	390,498	644,200	222	231	227
Trap rock:										
California	18	138	116	254	23,641	21,175	44,816	171	183	176
Connecticut	15	198	96	294	52,481	23,650	76,131	265	246	259
Maryland	7	75	28	103	16,165	5,869	22,034	216	210	214
Massachusetts	14	225	123	348	43,322	24,216	67,538	193	197	194
New Jersey	19	321	163	484	66,515	30,746	97,261	207	189	201
New York	3	71	94	165	17,991	19,879	37,870	253	211	230
Oregon	16	95	34	129	6,473	3,011	9,484	68	89	74
Pennsylvania	16	141	119	260	31,280	25,161	56,441	222	211	217
Virginia	5	65	31	96	8,554	3,874	12,428	132	125	129
Washington	14	254	73	327	51,240	10,619	61,859	202	145	189
Other States [6]	11	259	52	311	26,947	4,589	31,536	104	88	101
Total	138	1,842	929	2,771	344,609	172,789	517,398	187	186	187

[1] Includes limestone or other stone used in the manufacture of cement.
[2] Includes a small number of mills or other plants not operated in connection with quarries.
[3] Includes Arkansas, Colorado, Florida, Georgia, Idaho, Kentucky, Louisiana, Maine, Maryland, Minnesota, Montana, Nebraska, New Jersey, Oklahoma, Oregon, South Dakota, Utah, Wisconsin, and Wyoming.
[4] Includes Alabama, Arkansas, California, Colorado, Georgia, Maryland, Massachusetts, New York, North Carolina, Texas, Virginia, and Washington.
[5] Includes Arkansas, California, Georgia, Maine, Maryland, and Tennessee.
[6] Includes Idaho, Maine, Michigan, Montana, Rhode Island, Texas, and Wisconsin.

TABLE 17.—*Cement-rock,[1] marble, slate, and trap-rock quarries: Man-hours and number killed and injured, by States, during the year ended Dec. 31, 1939*

State	Man-hours of employment			Number killed			Number injured			Widows	Orphans
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total		
Cement rock: [1]											
Alabama	375,879	1,560,497	1,936,376				2	13	15		
California	583,130	3,218,405	3,801,535	1	2	3	37	88	125	3	11
Illinois	251,632	1,716,498	1,968,130	1		1	5	14	19	1	
Indiana	130,210	2,265,823	2,396,033		2	2	1	2	3	2	1
Iowa	261,605	2,154,561	2,416,166				2	6	8		
Kansas	237,191	1,486,586	1,723,777				3	2	5		
Michigan	84,037	3,800,678	3,884,715					12	12		
Missouri	276,430	1,787,305	2,063,735		1	1		3	3	1	
New York	482,438	2,736,894	3,219,332				4	6	10		
Ohio	362,825	2,685,962	3,048,787				3	13	16		
Pennsylvania	1,428,487	9,112,391	10,540,878				9	24	33		
Tennessee	244,657	1,248,090	1,492,747				7	13	20		
Texas	199,427	2,401,563	2,600,990		2	2	2	28	30	1	
Virginia	193,869	609,267	803,136				2	1	3		
Washington	239,014	1,117,336	1,356,350				13	12	25		
West Virginia	404,469	676,206	1,080,675				7	6	13		
Other States [2]	997,094	6,673,958	7,671,052	2	1	3	45	72	117	2	4
Total	6,752,394	45,252,020	52,004,414	4	8	12	142	315	457	10	16
Marble:											
Missouri	117,001	308,722	425,723				24	15	39		
Tennessee	1,477,915	1,215,761	2,693,676				133	77	210		
Vermont	593,128	1,565,880	2,159,008				48	40	88		
Other States [3]	353,309	1,411,963	1,765,272				23	69	92		
Total	2,541,353	4,502,326	7,043,679				228	201	429		
Slate:											
New York	47,306	61,654	108,960				3	13	16		
Pennsylvania	921,890	1,955,788	2,877,678				97	125	222		
Vermont	807,896	395,367	1,202,263	3		3	66	28	94	1	1
Virginia	219,740	620,624	840,364				14	13	27		
Other States [4]	129,068	179,792	308,860				6	11	17		
Total	2,125,900	3,213,225	5,339,125	3		3	186	190	376	1	1
Trap rock:											
California	189,129	169,400	358,529				23	7	30		
Connecticut	432,325	201,858	634,183	1		1	22	8	30	1	
Maryland	140,214	50,960	191,174	1		1	14		14	1	
Massachusetts	357,224	202,465	559,689		1	1	24	3	27	1	1
New Jersey	547,484	264,563	812,047				37	10	47		
New York	143,588	159,026	302,614				6	1	7		
Oregon	47,811	23,944	71,755				10		10		
Pennsylvania	256,699	205,973	462,672				15	4	19		
Virginia	80,017	36,607	116,624				6		6		
Washington	377,355	83,961	461,316				40	5	45		
Other States [5]	218,999	41,115	260,114	1		1	38	2	40	1	
Total	2,790,845	1,439,872	4,230,717	3	1	4	235	40	275	4	1

[1] Includes limestone or other stone used in the manufacture of cement.
[2] Includes Arkansas, Colorado, Florida, Georgia, Idaho, Kentucky, Louisiana, Maine, Maryland, Minnesota, Montana, Nebraska, New Jersey, Oklahoma, Oregon, South Dakota, Utah, Wisconsin, and Wyoming.
[3] Includes Alabama, Arkansas, California, Colorado, Georgia, Maryland, Massachusetts, NewYork, North Carolina, Texas, Virginia, and Washington.
[4] Includes Arkansas, California, Georgia, Maine, Maryland, and Tennessee.
[5] Includes Idaho, Maine, Michigan, Montana, Rhode Island, Texas, and Wisconsin.

TABLE 18.—*Granite quarries: Men employed and man-days, by States, during the year ended Dec. 31, 1939*

State	Number of quarries [1]	Men employed			Man-days of employment			Average days of employment per man		
		At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
California	32	635	318	953	151,089	87,015	238,104	238	274	250
Connecticut	8	41	55	96	8,551	13,430	21,981	209	244	229
Georgia	21	525	293	818	136,759	72,102	208,861	260	246	255
Maine	16	415	313	728	48,105	29,479	77,584	116	94	107
Massachusetts	24	245	334	579	46,295	73,483	119,778	189	220	207
Minnesota	28	212	510	722	52,430	135,048	187,478	247	265	260
Montana	9	371	3	374	65,630	463	66,093	177	154	177
New Hampshire	10	117	144	261	18,579	30,562	49,141	159	212	188
New York	5	110	69	179	23,487	16,434	39,921	214	238	223
North Carolina	14	464	410	874	106,504	96,450	202,954	230	235	232
Oklahoma	8	148	74	222	41,722	19,912	61,634	282	269	278
Pennsylvania	17	119	61	180	24,146	12,431	36,577	203	204	203
Rhode Island	8	58	74	132	11,468	14,960	26,428	198	202	200
South Carolina	5	204	165	369	57,016	44,054	101,070	279	267	274
South Dakota	5	55	64	119	14,496	16,693	31,189	264	261	262
Texas	9	39	19	58	8,439	5,055	13,494	216	266	233
Vermont	10	590	87	677	139,828	24,142	163,970	237	277	242
Virginia	9	167	101	268	37,753	28,264	66,017	226	280	246
Wisconsin	16	185	259	444	38,675	49,063	87,738	209	189	198
Other States [2]	40	234	103	337	41,979	22,958	64,937	179	223	193
Total	294	4,934	3,456	8,390	1,072,951	791,998	1,864,949	217	229	222

[1] Includes a small number of mills or other plants not operated in connection with quarries.
[2] Includes Arizona, Colorado, Delaware, Kansas, Maryland, Missouri, New Jersey, Oregon, and Washington.

TABLE 19.—*Granite quarries: Man-hours and number killed and injured, by States, during the year ended Dec. 31, 1939*

State	Man-hours of employment			Number killed			Number injured			Widows	Orphans
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total		
California	869,852	478,614	1,348,466	1	------	1	25	11	36	1	------
Connecticut	68,410	107,360	175,770	------	------	------	4	6	10	------	------
Georgia	1,106,224	583,342	1,689,566	2	------	2	28	7	35	1	------
Maine	385,088	236,023	621,111	------	------	------	26	4	30	------	------
Massachusetts	366,846	587,867	954,713	------	------	------	7	6	13	------	------
Minnesota	412,338	1,058,761	1,471,099	1	------	1	10	41	51	1	2
Montana	525,038	3,700	528,738	------	------	------	15	------	15	------	------
New Hampshire	143,500	242,504	386,004	------	------	------	2	10	12	------	------
New York	197,074	138,998	336,072	1	------	1	10	6	16	------	------
North Carolina	853,652	774,099	1,627,751	------	------	------	27	9	36	------	------
Oklahoma	333,779	159,296	493,075	------	------	------	5	8	13	------	------
Pennsylvania	203,667	101,176	304,843	------	------	------	26	------	26	------	------
Rhode Island	91,744	119,680	211,424	------	------	------	5	4	9	------	------
South Carolina	444,922	354,777	799,699	1	------	1	33	11	44	1	3
South Dakota	115,958	133,544	249,502	------	------	------	9	7	16	------	------
Texas	67,881	40,771	108,652	1	------	1	1	6	7	1	1
Vermont	1,027,040	193,136	1,220,176	------	------	------	60	7	67	------	------
Virginia	313,405	229,589	542,994	------	------	------	39	25	64	------	------
Wisconsin	308,106	392,507	700,613	1	------	1	29	36	65	1	------
Other States [1]	350,074	189,206	539,280	------	------	------	36	6	42	------	------
Total	8,184,598	6,124,950	14,309,548	8	------	8	397	210	607	6	6

[1] Includes Arizona, Colorado, Delaware, Kansas, Maryland, Missouri, New Jersey, Oregon, and Washington.

TABLE 20.—*Limestone quarries: Men employed and man-days, by States, during the year ended Dec. 31, 1939*

State	Number of quarries [1]	Men employed			Man-days of employment			Average days of employment per man		
		At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
Alabama	9	446	226	672	109,732	58,258	167,990	246	258	250
California	17	119	144	263	23,545	29,810	53,355	198	207	203
Colorado	7	95	17	112	16,181	3,049	19,230	170	179	172
Florida	21	276	189	465	60,117	34,767	94,884	218	184	204
Georgia	6	54	41	95	6,708	5,039	11,747	124	123	124
Illinois	61	1,661	589	2,250	334,604	114,882	449,486	201	195	200
Indiana	96	1,287	1,604	2,891	240,430	339,444	579,874	187	212	201
Iowa	42	352	119	471	51,060	17,274	68,334	145	145	145
Kansas	33	498	108	606	64,621	16,467	81,088	130	152	134
Kentucky	43	825	261	1,086	145,174	48,653	193,827	176	186	178
Maryland	13	86	29	115	16,705	5,033	21,738	194	174	189
Massachusetts	3	24	33	57	6,998	10,034	17,032	292	304	299
Michigan	14	798	716	1,514	182,682	159,961	342,643	229	223	226
Minnesota	22	359	207	566	35,854	29,371	65,225	100	142	115
Missouri	81	1,372	303	1,675	201,624	51,777	253,401	147	171	151
Montana	5	67	------	67	10,914	------	10,914	163	------	163
Nebraska	4	51	20	71	7,907	2,826	10,733	155	141	151
New York	50	975	631	1,606	197,975	126,039	324,014	203	200	202
Ohio	111	1,110	639	1,749	182,212	120,525	302,737	164	189	173
Oklahoma	14	182	54	236	32,970	9,534	42,504	181	177	180
Pennsylvania	129	1,917	1,114	3,031	385,199	240,190	625,389	201	216	206
Tennessee	19	229	89	318	44,814	18,736	63,550	196	211	200
Texas	12	219	176	395	48,577	35,683	84,260	222	203	213
Utah	5	46	14	60	7,690	3,296	10,986	167	235	183
Virginia	36	719	335	1,054	166,335	80,683	247,018	231	241	234
West Virginia	12	316	89	405	64,113	20,532	84,645	203	231	209
Wisconsin	45	378	110	488	61,617	15,107	76,724	163	137	157
Wyoming	4	98	15	113	16,301	3,699	20,000	166	247	177
Other States [2]	34	388	149	537	75,346	30,699	106,045	194	206	197
Total	948	14,947	8,021	22,968	2,798,005	1,631,368	4,429,373	187	203	193

[1] Includes a small number of mills or other plants not operated in connection with quarries.
[2] Includes Arizona, Arkansas, Connecticut, Idaho, Louisiana, Maine, Mississippi, New Jersey, New Mexico, North Carolina, South Carolina, South Dakota, Vermont, and Washington.

TABLE 21.—*Limestone quarries: Man-hours and number killed and injured, by States, during the year ended Dec. 31, 1939*

State	Man-hours of employment			Number killed			Number injured			Widows	Orphans
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total		
Alabama	907,950	462,391	1,370,341	------	1	1	19	11	30	1	1
California	185,324	237,269	422,593	------	------	------	25	5	30	------	------
Colorado	129,441	24,393	153,834	------	------	------	11	1	12	------	------
Florida	543,171	332,606	875,777	1	------	1	72	13	85	1	1
Georgia	54,225	37,777	92,002	------	------	------	6	1	7	------	------
Illinois	2,352,642	825,243	3,177,885	1	------	1	101	23	124	1	3
Indiana	1,970,500	2,763,851	4,734,351	------	2	2	147	96	243	2	------
Iowa	425,454	148,429	573,883	------	------	------	24	7	31	------	------
Kansas	511,857	131,600	643,457	------	------	------	23	------	23	------	------
Kentucky	1,253,901	440,224	1,694,125	------	1	1	105	18	123	1	------
Maryland	140,730	42,682	183,412	------	------	------	8	1	9	------	------
Massachusetts	58,702	84,802	143,504	------	------	------	2	4	6	------	------
Michigan	1,482,098	1,292,864	2,774,962	------	------	------	19	10	29	------	------
Minnesota	306,071	245,314	551,385	------	------	------	29	9	38	------	------
Missouri	1,475,373	399,787	1,875,160	2	------	2	164	8	172	1	1
Montana	90,533	------	90,533	------	------	------	24	------	24	------	------
Nebraska	64,249	24,314	88,563	------	------	------	3	------	3	------	------
New York	1,556,239	1,006,203	2,562,442	------	------	------	63	25	88	------	------
Ohio	1,562,361	1,023,339	2,585,700	1	1	2	55	32	87	1	1
Oklahoma	260,035	74,936	334,971	------	------	------	7	------	7	------	------
Pennsylvania	3,162,948	2,022,179	5,185,127	1	------	1	160	16	176	1	2
Tennessee	355,225	145,229	500,454	------	------	------	38	5	43	------	------
Texas	361,037	279,512	640,549	------	------	------	12	11	23	------	------
Utah	59,230	25,334	84,564	------	------	------	15	6	21	------	------
Virginia	1,369,194	646,458	2,015,652	1	------	1	83	20	103	1	4
West Virginia	545,335	187,678	733,013	------	1	1	17	12	29	1	1
Wisconsin	499,301	126,409	625,710	------	------	------	66	4	70	------	------
Wyoming	130,410	29,592	160,002	------	------	------	7	5	12	------	------
Other States [1]	617,698	248,174	865,872	1	------	1	82	13	95	1	1
Total	22,431,234	13,308,589	35,739,823	8	6	14	1,387	356	1,743	12	15

[1] Includes Arizona, Arkansas, Connecticut, Idaho, Louisiana, Maine, Mississippi, New Jersey, New Mexico, North Carolina, South Carolina, South Dakota, Vermont, and Washington.

TABLE 22.—*Limestone (chief product, lime) quarries: Men employed and man-days, by States, during the year ended Dec. 31, 1939*

State	Number of quarries [1]	Men employed			Man-days of employment			Average days of employment per man		
		At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
Alabama	6	176	178	354	51,032	51,228	102,260	290	288	289
Arizona	4	110	66	176	37,661	22,941	60,602	342	348	344
California	8	80	138	218	24,279	45,213	69,492	303	328	319
Florida	3	28	38	66	8,527	12,133	20,660	305	319	313
Illinois	8	74	144	218	21,638	40,808	62,446	292	283	286
Indiana	5	84	111	195	22,723	30,409	53,132	271	274	272
Maryland	9	76	59	135	18,154	14,264	32,418	239	242	240
Massachusetts	6	73	145	218	20,223	45,960	66,183	277	317	304
Michigan	4	7	48	55	926	14,793	15,719	132	308	286
Missouri	10	306	517	823	91,268	157,098	248,366	298	304	302
New York	7	31	65	96	7,719	16,308	24,027	249	251	250
Ohio	18	642	1,136	1,778	170,107	346,978	517,085	265	305	291
Pennsylvania	60	740	1,198	1,938	194,548	327,571	522,119	263	273	269
Tennessee	11	211	367	578	48,182	97,273	145,455	228	265	252
Texas	6	47	133	180	14,068	36,563	50,631	299	275	281
Vermont	4	45	83	128	11,598	22,003	33,601	258	265	263
Virginia	22	423	535	958	115,466	152,234	267,700	273	285	279
Washington	6	97	53	150	24,575	13,935	38,510	253	263	257
West Virginia	6	209	301	510	57,673	88,855	146,528	276	295	287
Wisconsin	9	75	93	168	20,459	26,501	46,960	273	285	280
Other States [2]	31	294	396	690	76,073	110,778	186,851	259	280	271
Total	243	3,828	5,804	9,632	1,036,899	1,673,846	2,710,745	271	288	281

[1] Includes a small number of mills or other plants not operated in connection with quarries.
[2] Includes Arkansas, Colorado, Connecticut, Georgia, Idaho, Kentucky, Maine, Minnesota, Montana, Nevada, New Jersey, New Mexico, Oklahoma, Oregon, Rhode Island, South Dakota, and Utah.

TABLE 23.—*Limestone (chief product, lime) quarries: Man-hours and number killed and injured, by States, during the year ended Dec. 31, 1939*

State	Man-hours of employment			Number killed			Number injured			Widows	Orphans
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total		
Alabama	296,634	349,603	646,237	------	------	------	43	14	57	------	------
Arizona	294,738	181,654	476,392	------	------	------	5	1	6	------	------
California	183,307	347,818	531,125	------	------	------	15	22	37	------	------
Florida	68,212	97,001	165,213	------	------	------	5	9	14	------	------
Illinois	167,130	334,943	502,073	------	------	------	------	10	10	------	------
Indiana	134,144	190,205	324,349	------	------	------	5	4	9	------	------
Maryland	143,288	114,858	258,146	------	2	2	9	2	11	1	2
Massachusetts	157,196	358,604	515,800	------	------	------	24	33	57	------	------
Michigan	7,408	126,723	134,131	------	------	------	1	5	6	------	------
Missouri	596,323	1,173,422	1,769,745	------	------	------	47	54	101	------	------
New York	63,516	130,971	194,487	1	------	1	------	6	6	1	------
Ohio	1,327,332	2,544,366	3,871,698	1	------	1	37	53	90	1	1
Pennsylvania	1,581,109	2,508,417	4,089,526	2	------	2	114	65	179	2	7
Tennessee	369,895	741,804	1,111,699	------	------	------	34	30	64	------	------
Texas	91,309	264,076	355,385	------	------	------	5	11	16	------	------
Vermont	95,592	176,648	272,240	------	------	------	9	17	26	------	------
Virginia	843,236	1,139,321	1,982,557	1	------	1	97	57	154	1	2
Washington	193,491	119,893	313,384	------	------	------	22	8	30	------	------
West Virginia	402,893	701,767	1,104,660	------	------	------	6	7	13	------	------
Wisconsin	135,581	190,641	326,222	------	------	------	11	12	23	------	------
Other States [1]	578,697	862,694	1,441,391	------	------	------	54	41	95	------	------
Total	7,731,031	12,655,429	20,386,460	5	2	7	543	461	1,004	6	12

[1] Includes Arkansas, Colorado, Connecticut, Georgia, Idaho, Kentucky, Maine, Minnesota, Montana, Nevada, New Jersey, New Mexico, Oklahoma, Oregon, Rhode Island, South Dakota, and Utah.

TABLE 24.—*Sandstone quarries: Men employed and man-days, by States, during the year ended Dec. 31, 1939*

State	Number of quarries [1]	Men employed			Man-days of employment			Average days of employment per man		
		At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
California	12	34	33	67	5,955	6,761	12,716	175	205	190
Colorado	8	89	4	93	21,860	776	22,636	246	194	243
Missouri	4	83	17	100	6,851	4,538	11,389	83	267	114
New York	21	136	34	170	17,734	6,075	23,809	130	179	140
Ohio	17	264	336	600	56,801	84,448	141,249	215	251	235
Pennsylvania	56	618	161	779	118,699	31,448	150,147	192	195	193
South Dakota	6	230	57	287	28,260	8,274	36,534	123	145	127
Tennessee	3	30	25	55	7,009	5,976	12,985	234	239	236
West Virginia	11	157	105	262	25,930	17,712	43,642	165	169	167
Wisconsin	7	151	6	157	35,392	1,219	36,611	234	203	233
Other States [2]	37	429	114	543	82,856	19,360	102,216	193	170	188
Total	182	2,221	892	3,113	407,347	186,587	593,934	183	209	191

[1] Includes a small number of mills or other plants not operated in connection with quarries.
[2] Includes Alabama, Arizona, Connecticut, Illinois, Kansas, Kentucky, Maryland, Massachusetts, Minnesota, Montana, New Jersey, Oregon, Texas, Vermont, Virginia, Washington, and Wyoming.

TABLE 25.—*Sandstone quarries: Man-hours and number killed and injured, by States, during the year ended Dec. 31, 1939*

State	Man-hours of employment			Number killed			Number injured			Widows	Orphans
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total		
California	46,095	57,434	103,529	------	------	------	5	3	8	------	------
Colorado	156,653	6,208	162,861	------	------	------	9	1	10	------	------
Missouri	54,804	36,303	91,107	------	------	------	1	2	3	------	------
New York	144,188	55,435	199,623	------	------	------	8	1	9	------	------
Ohio	454,643	675,580	1,130,223	------	------	------	16	15	31	------	------
Pennsylvania	956,059	259,515	1,215,574	------	------	------	72	18	90	------	------
South Dakota	225,413	64,916	290,329	------	------	------	15	------	15	------	------
Tennessee	56,067	47,809	103,876	------	------	------	8	9	17	------	------
West Virginia	209,206	142,664	351,870	------	------	------	22	3	25	------	------
Wisconsin	287,414	9,787	297,201	------	------	------	16	------	16	------	------
Other States [1]	686,887	159,737	846,624	------	------	------	85	4	89	------	------
Total	3,277,429	1,515,388	4,792,817	------	------	------	257	56	313	------	------

[1] Includes Alabama, Arizona, Connecticut, Illinois, Kansas, Kentucky, Maryland, Massachusetts, Minnesota, Montana, New Jersey, Oregon, Texas, Vermont, Virginia, Washington, and Wyoming.

TABLE 26.—*Accident-frequency rates per million man-hours of employment, by causes and kinds of stone for the years ended Dec. 31, 1938 and 1939*

[Includes fatal and nonfatal accidents]

Cause	Cement rock [1]		Granite		Limestone		Limestone (chief product, lime)		Marble		Sandstone		Slate		Trap rock	
	1938	1939	1938	1939	1938	1939	1938	1939	1938	1939	1938	1939	1938	1939	1938	1939
OPEN QUARRY																
1. Falls or slides of rock or overburden	2.05	2.50	4.24	5.76	5.95	5.08	8.49	8.12	3.67	3.34	2.85	9.41	5.06	5.04	8.84	10.49
2. Handling materials	3.72	3.92	13.71	11.03	19.37	20.03	27.64	25.98	9.63	7.16	22.78	19.77	32.90	29.24	19.39	19.17
3. Hand tools	1.86	.71	2.99	3.06	4.12	3.08	4.33	2.51	11.01	10.98	4.98	6.90	3.16	8.07	2.72	5.42
4. Explosives	.37	3.57	1.75	.49	.99	1.07	3.00	.59	.46		.36	.31	1.27	2.02	1.02	1.08
5. Haulage	1.68	2.14	2.74	1.59	4.44	4.10	7.83	9.30	.92	3.82	4.27	3.77	2.53	7.06	1.36	3.98
6. Falls of persons	1.86	1.43	5.23	4.90	6.52	6.20	6.16	5.02	9.63	16.23	7.12	11.30	6.96	12.10	13.95	7.23
7. Falling objects (other than 1 and 2)	.74	.18	2.24	2.57	2.30	1.91	.83	1.92	5.04	6.21	3.91	2.83	.63	5.54	2.04	3.62
8. Flying objects		.53	5.23	6.25	10.34	9.28	6.99	8.41	14.67	20.53	7.47	6.59	1.90	7.56	9.86	9.04
9. Electricity	.56	.18		.49	.52	.29	.33	.59			1.07		.63			.36
10. Drilling and channeling (by machine or hand)	.56	1.25	5.11	2.33	3.44	2.64	1.67	2.80	8.25	6.68	4.27	.94	1.27	1.51	4.42	2.89
11. Machinery	1.12	1.60	4.74	4.66	4.75	4.79	1.33	2.51	5.96	9.07	6.05	6.59	3.79	2.52	6.12	10.85
12. Stepping on nail			.50	.61	.21	.34	.83		.92	1.43			.63			
13. Boiler and air-tank explosions						.15			.46							.36
14. Burns	.37	.18	.50	.49	1.67	.78	1.50	.74	3.21		.71	.94			1.02	1.81
15. Other causes	.19	.89	2.87	5.03	4.49	3.76	6.49	5.17	10.55	5.73	6.41	10.98	1.27	11.59	2.72	9.04
Total, at open quarry	15.08	19.08	51.85	49.26	69.11	63.50	77.42	73.66	84.38	91.19	72.25	80.33	62.00	92.25	73.47	85.34
UNDERGROUND QUARRY																
1. Fall of rock from roof or wall	2.97	2.62			6.22	3.06	14.81	9.40					31.81	7.03	27.87	39.12
2. Rock while loading at working face or chute	15.82	6.98			13.68	12.25	22.22	19.85	7.10	4.48						39.12
3. Hand tools	.98	2.62			1.24	6.64	2.12	5.23	3.55	17.90			15.91	7.03		
4. Explosives	1.98	3.49			.62	.51	1.06			2.24			7.95	7.03		
5. Haulage	1.98	2.62			5.60	4.59	5.29	5.23		4.48			7.95			
6. Falling down chute, winze, raise, or stope		.87				1.02								7.03		
7. Run of rock from chute or pocket	4.94	7.85			1.24	1.53							7.95			
8. Drilling	5.93	2.62	83.00		4.98	7.15		8.36		13.43			7.95	7.03		
9. Electricity																
10. Machinery (other than locomotives or drills)	2.97	.87			.62	2.55	3.17			2.24						
11. Mine fires																
12. Suffocation from natural gases																

13. Inrush of water																
14. Stepping on nail					1.24		4.23			2.24						
15. Handling materials (other than rock)	2.97	1.75			3.11	3.06		1.04	3.55	8.95						
16. Other causes	11.86	1.75		125.00	5.60	5.62	1.06	2.09	10.66	26.85		11.03	7.95	7.03		
Total, at underground quarry	52.40	34.04	83.00	125.00	44.16	47.98	53.96	51.20	24.87	82.81		11.03	87.47	42.21	27.87	78.25
SHAFT OR SLOPE																
17. Falling down shaft or slope																
18. Objects falling down shaft or slope	0.98					0.51										
19. Breaking of cables	1.98															
20. Overwinding																
21. Cage, skip, or bucket																
22. Other causes	1.98															
Total, in shaft or slope	4.94					0.51										
Total, underground (including shaft)	57.35	34.04	83.00	125.00	44.16	48.49	53.96	51.20	24.87	82.81		11.03	87.47	42.21	27.87	78.25
OUTSIDE WORKS																
1. Haulage	0.45	0.42	0.83		3.30	1.13	3.05	1.97	3.66	1.55	1.37	1.98	3.11	7.16	2.05	2.08
2. Machinery	1.61	1.50	5.00	4.08	7.85	6.69	4.67	3.24	4.15	6.44	4.78	6.59	6.61	3.73	8.20	7.64
3. Hand tools	.47	.44	3.17	4.25	3.85	2.48	3.14	2.53	3.17	3.33	1.37	5.28	9.33	6.85	3.42	2.78
4. Stepping on nail	.05	.02	.33	1.31	.31	.22	.54	.16	.98	.22	.68					
5. Electricity	.17	.24	.17		.31	.53	.36	.63			.68	.66	.78	.93		
6. Falls of persons	1.14	.97	2.00	1.47	3.77	2.63	4.13	3.40	3.17	3.33	3.41	1.98	3.50	3.73	5.46	2.08
7. Falling objects (rocks, timbers, etc.)	.62	.66	1.83	2.61	4.55	2.48	2.60	2.84	6.35	5.55	2.05	4.62	1.95	4.67	3.42	1.39
8. Flying objects	.64	.55	8.84	8.82	5.49	2.25	3.68	3.48	7.32	4.00	3.41	3.96	2.72	3.42	4.10	4.86
9. Handling materials	1.09	.93	5.34	3.10	4.39	4.88	5.75	7.51	13.18	16.44	8.19	7.92	20.22	23.34	4.10	2.08
10. Burns	.36	.75	.33	1.14	2.04	.75	6.01	4.82	.73	.89	1.37	1.32	.39	.62	2.05	.70
11. Other causes	1.59	.64	3.00	7.51	4.86	3.16	5.03	6.01	4.15	2.89	6.14	2.64	3.89	4.67	9.57	4.86
Total, at outside works	8.19	7.14	30.84	34.29	40.71	27.20	38.96	36.59	46.87	44.64	33.45	36.95	52.50	59.13	42.37	28.47
Grand total	9.98	9.02	42.93	42.98	57.12	49.16	52.51	49.59	58.39	60.91	58.15	65.31	57.04	70.98	62.85	65.95

[1] Includes limestone or other stone used in the manufacture of cement.

DIMENSION-STONE AND NONDIMENSION-STONE QUARRIES

In 1939, as in previous years, reports from operating companies were classified according to the general use to which the material was to be put. Special data were compiled for quarries producing stone for building or monumental use or for any purpose requiring shaping of the stone. A second class covered reports from quarries whose output was crushed or powdered for use in road building, as flux, for agricultural purposes, or in the manufacture of cement or lime, or whose rock was to be used in unshaped or irregular form. A third group covered reports from quarries which did not indicate clearly the use for which the stone was produced.

Employment and accident data are given for the three groups of quarries in tables 27 to 32, inclusive. More than four times as many employees and man-hours of work were performed at non-dimension-stone as at dimension-stone properties. Cement rock and limestone for making cement were the principal kinds of stone in the non-dimension-stone group. Granite was the principal stone in the dimension-stone group. The third group covered quarries whose reports did not clearly indicate whether their output was to be used in dimension or nondimension form. This group was small, covering only 1,531 employees out of a total of 79,449 in the three groups combined.

The leading causes of accidents for both dimension-stone and nondimension stone inside the open quarries were handling materials, flying objects, and falls of persons. However, non-dimension-stone quarries had a more favorable accident-frequency rate—32.73 per million man-hours of exposure to risk—than dimension-stone quarries, whose rate was 54.04. This favorable showing for nondimension stone must be credited largely to the cement industry, without whose record (accident-frequency rate 9.02) the rate for the group was 52.09.

Limestone quarries whose output was to be used as dimension stone had an accident-frequency rate of 48.65, which compares with 48.89 for quarries producing the same kind of stone to be used in crushed or nondimension form. Sandstone quarries had a dimension-stone rate of 50.51 compared with 75.28 for nondimension stone. The rates for granite quarries were 41.62 for dimension stone and 53.49 for nondimension stone.

Vermont and Indiana employed the largest number of men at dimension-stone quarries, whereas Pennsylvania, Ohio, and New York employed the largest number at nondimension-stone quarries.

TABLE 27.—*Dimension-stone and nondimension-stone quarries: Men employed and man-days, by kinds of quarry, during the year ended Dec. 31, 1939*

Kind of quarry	Men employed			Man-days of employment			Average days of employment per man		
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
Dimension stone:									
Granite	2,503	2,451	4,954	514,613	534,779	1,049,392	206	218	212
Limestone	986	1,524	2,510	204,737	346,586	551,323	208	227	220
Marble	1,225	2,201	3,426	281,633	541,700	823,333	230	246	240
Sandstone	718	446	1,164	140,747	107,551	248,298	196	241	213
Slate	981	1,342	2,323	223,631	315,472	539,103	228	235	232
Trap rock	20		20	2,754		2,754	138		138
Total	6,433	7,964	14,397	1,368,115	1,846,088	3,214,203	213	232	223
Nondimension stone:									
Cement rock [1]	3,796	22,249	26,045	889,510	6,202,091	7,091,601	234	279	272
Granite	1,988	751	2,739	435,135	183,835	618,970	219	245	226
Limestone	13,557	6,399	19,956	2,511,609	1,267,158	3,778,767	185	198	189
Limestone (chief product, lime)	3,828	5,804	9,632	1,036,899	1,673,846	2,710,745	271	288	281
Marble	55	56	111	4,714	11,548	16,262	86	206	147
Sandstone	1,491	438	1,929	264,540	78,150	342,690	177	178	178
Slate	116	258	374	19,984	54,148	74,132	172	210	198
Trap rock	1,806	929	2,735	340,467	172,789	513,256	189	186	188
Total	26,637	36,884	63,521	5,502,858	9,643,565	15,146,423	207	261	238
All other and not stated:									
Granite	443	254	697	123,203	73,384	196,587	278	289	282
Limestone	404	98	502	81,659	17,624	99,283	202	180	198
Marble	109	51	160	25,043	9,242	34,285	230	181	214
Sandstone	12	8	20	2,060	886	2,946	172	111	147
Slate	46	90	136	10,087	20,878	30,965	219	232	228
Trap rock	16		16	1,388		1,388	87		87
Total	1,030	501	1,531	243,440	122,014	365,454	236	244	239
Grand total	34,100	45,349	79,449	7,114,413	11,611,667	18,726,080	209	256	236

[1] Includes limestone or other stone used in the manufacture of cement.

TABLE 28.—*Dimension-stone and nondimension-stone quarries: Accident rates per million man-hours during the year ended Dec. 31, 1939*

Kind of quarry	Man-hours of employment				Killed						Injured					
					At quarry		At outside works		Total		At quarry		At outside works		Total	
	Open quarries	Underground quarries	At outside works	Total	Number	Per million man-hours	Number	Per million man-hours	Number	Per million man-hours	Number	Per million man-hours	Number	Per million man-hours	Number	Per million man-hours
Dimension stone:																
Granite	3,989,772	24,000	4,250,752	8,264,524	5	1.25			5	0.60	183	45.59	156	36.70	339	41.02
Limestone	1,626,079		2,772,192	4,398,271			2	0.72	2	.45	105	64.57	107	38.60	212	48.20
Marble	1,833,509	445,164	4,320,213	6,598,886							220	96.55	178	41.20	398	60.31
Sandstone	1,102,929	14,000	862,779	1,979,708							74	66.25	26	30.14	100	50.51
Slate	1,776,529	98,072	2,584,996	4,459,597	3	1.60			3	.67	175	93.35	154	59.57	329	73.77
Trap rock	21,994			21,994							2	90.93			2	90.93
Total	10,350,812	581,236	14,790,932	25,722,980	8	.73	2	.14	10	.39	759	69.43	621	41.99	1,380	53.65
Nondimension stone:																
Cement rock [1]	5,606,780	1,145,614	45,252,020	52,004,414	4	.59	8	.18	12	.23	142	21.03	315	6.96	457	8.79
Granite	3,524,504		1,504,625	5,029,129	3	.85			3	.60	212	60.15	54	35.89	266	52.89
Limestone	18,203,439	1,941,172	10,392,043	30,536,654	7	.35	4	.38	11	.36	1,239	61.51	243	23.38	1,482	48.53
Limestone (chief product, lime)	6,774,079	956,952	12,655,429	20,386,460	5	.65	2	.16	7	.34	543	70.24	461	36.43	1,004	49.25
Marble	40,176		93,287	133,463							1	24.89	18	192.95	19	142.36
Sandstone	2,067,394	76,630	645,525	2,789,549							180	83.95	30	46.47	210	75.28
Slate	145,014	17,042	440,327	602,383							7	43.19	31	70.40	38	63.08
Trap rock	2,732,189	25,560	1,439,872	4,197,621	3	1.09	1	.69	4	.95	233	84.49	40	27.78	273	65.04
Total	39,093,575	4,162,970	72,423,128	115,679,673	22	.51	15	.21	37	.32	2,557	59.11	1,192	16.46	3,749	32.41
All other and not stated:																
Granite	646,322		369,573	1,015,895							2	3.09			2	1.97
Limestone	642,536	18,008	144,354	804,898	1	1.51			1	1.24	43	65.10	6	41.56	49	60.88
Marble	220,872	1,632	88,826	311,330							7	31.46	5	56.29	12	38.54
Sandstone	16,476		7,084	23,560							3	182.08			3	127.33
Slate	62,216	27,027	187,902	277,145							4	44.82	5	26.61	9	32.47
Trap rock	11,102			11,102												
Total	1,599,524	46,667	797,739	2,443,930	1	.61			1	.41	59	35.84	16	20.06	75	30.69
Grand total	51,043,911	4,790,873	88,011,799	143,846,583	31	.56	17	.19	48	.33	3,375	60.45	1,829	20.78	5,204	36.18

[1] Includes limestone or other stone used in the manufacture of cement.

TABLE 29.—*Dimension-stone and nondimension-stone quarries: Fatalities and injuries, classified by kind of quarry and severity of injury, during the year ended Dec. 31, 1939*

[No accidents occurred in classes of quarries not listed]

Kind of quarry	Open quarry																Underground quarry									
	Falls or slides of rock or overburden	Handling materials	Hand tools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Stepping on nail	Boiler and air-tank explosions	Burns	Other causes	Total	Fall of rock from roof or wall	Rock while loading at working face or chute	Hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of rock from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		1	2	3	4	5	6	7	8	9	10
DIMENSION STONE																										
Killed:																										
Granite		1			1	1					1				1	5										
Limestone																										
Slate	1			1		1										3										
Total	1	1		1	1	2					1				1	8										
Permanent total:[1]																										
Granite											1					1										
Total											1					1										
Permanent partial:[2]																										
Granite	1		1					1								3										
Limestone											1					1										
Marble											2					2					1			1		
Slate						1										1										
Trap rock			1													1										
Total	1		2			1		1			3					8					1			1		

TABLE 29.—*Dimension-stone and nondimension-stone quarries: Fatalities and injuries, classified by kind of quarry and severity of injury, during the year ended Dec. 31, 1939*—Continued

[No accidents occurred in classes of quarries not listed]

Kind of quarry	Open quarry																Underground quarry									
	Falls or slides of rock or overburden	Handling materials	Hand tools	Explosives	Haulage	Falls of persons	Falling objects (other than 1 and 2)	Flying objects	Electricity	Drilling and channeling (by machine or hand)	Machinery	Stepping on nail	Boiler and air-tank explosions	Burns	Other causes	Total	Fall of rock from roof or wall	Rock while loading at working face or chute	Hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of rock from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		1	2	3	4	5	6	7	8	9	10
DIMENSION STONE—continued																										
Temporary:[3]																										
Granite	12	38	9	----	1	19	17	27	1	8	13	3	----	2	26	176	----	----	----	----	----	----	----	----	----	----
Limestone	2	33	2	----	1	11	2	16	----	13	10	----	----	1	13	104	----	----	----	----	----	----	----	----	----	----
Marble	7	14	22	----	8	29	13	42	----	14	17	3	----	----	12	181	----	2	8	1	1	----	----	5	----	1
Sandstone	8	9	7	----	----	18	3	7	----	1	5	----	----	3	12	73	----	----	----	----	----	----	----	----	----	----
Slate	7	56	15	3	12	22	11	13	----	3	4	----	----	----	23	169	1	----	----	1	----	1	----	1	----	----
Trap rock	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----
Total	36	151	55	3	22	99	46	105	1	39	49	6	----	6	86	704	1	2	8	2	1	1	----	6	----	1
NONDIMENSION STONE																										
Killed:																										
Cement rock [4]	----	----	----	2	----	----	----	----	1	----	----	----	----	----	----	3	----	----	----	----	----	----	1	----	----	----
Granite	1	----	----	----	----	----	----	----	1	----	1	----	----	----	----	3	----	----	----	----	----	----	----	----	----	----
Limestone	2	1	----	1	----	2	----	----	----	----	----	----	----	----	1	7	----	----	----	----	----	----	----	----	----	----
Limestone (chief product, lime)	2	----	----	----	----	----	----	----	----	----	1	----	----	1	----	4	1	----	----	----	----	----	----	----	----	----
Trap rock	1	----	----	----	1	----	----	----	----	----	----	----	----	1	----	3	----	----	----	----	----	----	----	----	----	----
Total	6	1	----	3	1	2	----	----	2	----	2	----	----	2	1	20	1	----	----	----	----	----	1	----	----	----
Permanent total:[1]																										
Granite	----	1	----	----	----	----	----	1	----	----	----	----	----	----	----	2	----	----	----	----	----	----	----	----	----	----
Limestone	----	----	----	1	2	----	----	----	----	----	1	----	----	----	----	4	----	----	----	1	----	----	----	----	----	----
Total	----	1	----	1	2	----	----	1	----	----	1	----	----	----	----	6	----	----	----	1	----	----	----	----	----	----

Permanent partial:[2]																										
Cement rock[4]	1	1	1	3	1	1	1			2	1					12										
Granite		2			1											3										
Limestone	3	5	2	4	4	2	2	6		1	1				1	31					1					1
Limestone (chief product, lime)	1				5			3							1	10	1				1					
Sandstone	1					1		1								3										
Trap rock	1	1			1	1					1			1		6										
Total	7	9	3	7	12	5	3	10		3	3			1	2	65	1				2					1
Temporary:[3]																										
Cement rock[4]	13	21	3	15	11	7		3		5	8			1	5	92	3	8	3	4	3	1	8	3		1
Granite	33	48	15	3	10	20	4	21	2	11	22	2		2	14	207										
Limestone	96	346	55	14	77	110	35	161	6	39	84	7	3	14	62	1,109	6	24	13		8	2	3	14		4
Limestone (chief product, lime)	52	176	17	4	58	34	13	54	4	19	16			4	34	485	7	19	5		4			8		
Marble			1													1										
Sandstone	20	52	15	1	12	17	6	13		2	16				23	177										
Slate	1	2	1					2								6			1							
Trap rock	27	51	14	3	9	19	10	25	1	8	29		1	3	25	225	1	1								
Total	242	696	121	40	177	207	68	279	13	84	175	9	4	24	163	2,302	17	52	22	4	15	3	11	25		5
ALL OTHER AND NOT STATED																										
Killed:																										
Limestone	1															1										
Total	1															1										
Permanent partial:[2]																										
Slate											1					1										
Total											1					1										
Temporary:[3]																										
Granite				1				1								2										
Limestone		25	4	2		2		7		1	1			1		43										
Marble		1				5		1								7										
Sandstone	1	2														3										
Slate	1				2											3										
Total	2	28	4	3	2	7		9		1	1			1		58										
All quarries:																										
Killed	8	2		4	2	4			2		3			2	2	29	1						1			
Permanent total [1]		1		1	2			1			2					7				1						
Permanent partial [2]	8	9	5	7	12	6	3	11		3	7			1	2	74	1				3			1		1
Temporary [3]	280	875	180	46	201	313	114	393	14	124	225	15	4	31	249	3,064	18	54	30	6	16	4	11	31		6
Total, nonfatal	288	885	185	54	215	319	117	405	14	127	234	15	4	32	251	3,145	19	54	30	7	19	4	11	32		7

[1] Permanent total disability: Loss of both legs or arms, 1 leg and 1 arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[2] Permanent partial disability: Loss of 1 foot, leg, hand, or eye, 1 or more fingers, 1 or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

[3] Disability for more than remainder of day of accident.

[4] Includes limestone or other stone used in the manufacture of cement.

TABLE 29.— *Dimension-stone and nondimension-stone quarries: Fatalities and injuries, classified by kind of quarry and severity of injury, during the year ended Dec. 31, 1939*—Continued

Kind of quarry	Underground quarry—Con.							Shaft or slope							At outside works												
	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock)	Other causes	Total	Falling down shaft or slope	Objects falling down shaft or slope	Breaking of cables	Overwinding	Cage, skip, or bucket	Other causes	Total	Haulage	Machinery	Hand tools	Stepping on nail	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling materials	Burns	Other causes	Total	Grand total
	11	12	13	14	15	16		17	18	19	20	21	22		1	2	3	4	5	6	7	8	9	10	11		
DIMENSION STONE																											
Killed:																											
Granite																											5
Limestone																				1	1					2	2
Slate																											3
Total																				1	1					2	10
Permanent total:[1]																											
Granite																											1
Total																											1
Permanent partial:[2]																											
Granite																1						1	1	1		4	7
Limestone																2										2	3
Marble							2									5							3			8	12
Slate																	1					1	2			4	5
Trap rock																											1
Total							2									8	1					2	6	1		18	28

Temporary: [3]																													
Granite						3	3									8	22	3		5	11	50	16	3	34	152	331
Limestone														3	27	7			10	7	14	16	1	20	105	209
Marble				1	4	12	35							5	20	11	1		15	25	18	61	4	10	170	386
Sandstone						1	1							1	1	4			1	6	3	8		2	26	100
Slate						1	5							22	9	16			7	10	7	70		9	150	324
Trap rock																											1
Total				1	4	17	44							31	65	60	4		38	59	92	171	8	75	603	1,351
NONDIMENSION STONE																													
Killed:																													
Cement rock [4]							1								2				1	2			1	2	8	12
Granite																											3
Limestone														1					2					1	4	11
Limestone (chief product, lime)							1												1				1		2	7
Trap rock																						1			1	4
Total							2							1	2				4	2		1	2	3	15	37
Permanent total: [1]																													
Granite																											2
Limestone							1																				5
Total							1																				7
Permanent partial: [2]																													
Cement rock [4]														1	15			1	2	1	2	1	1		24	36
Granite															1										1	4
Limestone							2								6				2		1	3	1	1	14	47
Limestone (chief product, lime)							2																	1	1	13
Sandstone																					1				1	4
Trap rock															2										2	8
Total							4							1	24			1	4	1	4	4	2	2	43	112
Temporary: [3]																													
Cement rock [4]					2	2	38							18	51	20	1	10	41	27	23	41	32	27	291	421
Granite															15	4	5		4	5	3	2	3	12	53	260
Limestone					6	11	91		1				1	11	52	26	3	7	20	25	15	43	8	19	229	1,430
Limestone (chief product, lime)					1	2	46							25	41	32	2	8	42	36	44	95	60	75	460	991
Marble														2	3	4						9			18	19
Sandstone														2	9	4		1	2	1	2	4	2	2	29	206
Slate							1							1	1	5		3	5	5	3	2	1	5	31	38
Trap rock							2							3	9	4			3	2	7	2	1	7	38	265
Total					9	15	178		1				1	62	181	99	11	29	117	101	97	198	107	147	1,149	3,630

See footnotes at end of table.

Kind of quarry	Underground quarry—Con.							Shaft or slope							At outside works												
	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock)	Other causes	Total	Falling down shaft or slope	Objects falling down shaft or slope	Breaking of cables	Overwinding	Cage, skip, or bucket	Other causes	Total	Haulage	Machinery	Hand tools	Stepping on nail	Electricity	Falls of persons	Falling objects (rocks, timbers, etc.)	Flying objects	Handling materials	Burns	Other causes	Total	Grand total
	11	12	13	14	15	16		17	18	19	20	21	22		1	2	3	4	5	6	7	8	9	10	11		
ALL OTHER AND NOT STATED																											
Killed:																											
Limestone																											1
Total																											1
Permanent partial: [2]																											
Slate																											1
Total																											1
Temporary: [3]																											
Granite																											2
Limestone																2							3		1	6	49
Marble																1							1		3	5	12
Sandstone																											3
Slate																2							1	1	1	5	8
Total																5							5	1	5	16	74

All quarries:																												
Killed							2								1	2				5	3		1	2	3	17	48
Permanent total [1]							1																				8
Permanent partial [2]							6								1	32	1		1	4	1	6	10	3	2	61	141
Temporary [3]				1	13	32	222		1					1	93	251	159	15	29	155	160	189	374	116	227	1,768	5,055
Total, nonfatal				1	13	32	229		1					1	94	283	160	15	30	159	161	195	384	119	229	1,829	5,204

[1] Permanent total disability: Loss of both legs or arms, 1 leg and 1 arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[2] Permanent partial disability: Loss of 1 foot, leg, hand, or eye, 1 or more fingers, 1 or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

[3] Disability for more than remainder of day of accident.

[4] Includes limestone or other stone used in the manufacture of cement.

TABLE 30.—*Dimension-stone and nondimension-stone quarries: Total number of men employed, man-days, man-hours, number killed and injured, and rates per million man-hours, by States, during the year ended Dec. 31, 1939*

State	Dimension stone							Nondimension stone							All other and not stated						
	Men employed	Man-days	Man-hours	Killed	Injured	Rate		Men employed	Man-days	Man-hours	Killed	Injured	Rate		Men employed	Man-days	Man-hours	Killed	Injured	Rate	
						Killed	Injured						Killed	Injured						Killed	Injured
Alabama	410	95,797	772,880		49		63.40	1,888	485,339	3,467,498	1	87	0.29	25.09	90	22,911	183,291		1		5.46
Arizona	(1)	(1)	(1)	(1)	(1)	(1)	(1)	236	66,303	522,002		7		13.41							
Arkansas	(1)	(1)	(1)	(1)	(1)	(1)	(1)	230	55,246	433,933		33		76.05							
California	111	16,916	130,365		5		38.35	2,744	716,389	5,530,640	4	260	.72	47.01	662	186,892	938,336		3		3.20
Colorado	168	38,025	285,942		12		41.97	361	80,365	611,008	2	39	3.27	63.83	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Connecticut	115	22,931	183,389		10		54.53	368	92,880	768,173	1	37	1.30	48.17	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Delaware								(1)	(1)	(1)	(1)	(1)	(1)	(1)							
Florida	(1)	(1)	(1)	(1)	(1)	(1)	(1)	768	162,686	1,417,704	1	100	.71	70.54							
Georgia	1,130	237,850	1,886,583	1	46	0.53	24.38	739	180,336	1,441,278	2	46	1.39	31.92							
Idaho	(1)	(1)	(1)	(1)	(1)	(1)	(1)	127	19,723	136,179		7		51.40							
Illinois	(1)	(1)	(1)	(1)	(1)	(1)	(1)	3,644	805,529	5,551,134	2	153	.36	27.56	60	10,783	108,130		1		9.25
Indiana	1,885	411,083	3,288,330	2	163	.61	49.57	2,343	550,405	4,163,203	2	92	.48	22.10	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Iowa	(1)	(1)	(1)	(1)	(1)	(1)	(1)	1,593	364,083	2,860,540		37		12.93	70	18,011	128,909		2		15.51
Kansas	(1)	(1)	(1)	(1)	(1)	(1)	(1)	1,466	296,872	2,325,863		36		15.48	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Kentucky	(1)	(1)	(1)	(1)	(1)	(1)	(1)	1,383	271,291	2,323,008	1	132	.43	56.82	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Louisiana								(1)	(1)	(1)	(1)	(1)	(1)	(1)							
Maine	816	92,569	740,356		38		51.33	270	65,891	523,172		16		30.58							
Maryland	99	24,587	211,704		23		108.64	875	199,586	1,480,934	3	57	2.03	38.49	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Massachusetts	579	123,234	986,464		11		11.15	731	176,059	1,421,450	1	94	.70	66.13							
Michigan								3,409	872,429	6,913,896		65		9.40	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Minnesota	841	214,456	1,686,965	1	61	.59	36.16	737	113,492	923,125		48		52.00	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Mississippi								(1)	(1)	(1)	(1)	(1)	(1)	(1)							
Missouri	231	59,039	459,075		40		87.13	3,602	797,786	5,741,087	2	274	.35	47.73	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Montana	(1)	(1)	(1)	(1)	(1)	(1)	(1)	550	100,593	796,638		41		51.47							
Nebraska								319	98,143	620,421		5		8.06							
Nevada								(1)	(1)	(1)	(1)	(1)	(1)	(1)							
New Hampshire	204	42,655	341,088		11		32.25	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
New Jersey	(1)	(1)	(1)	(1)	(1)	(1)	(1)	1,079	261,348	1,964,884		77		39.19							
New Mexico								(1)	(1)	(1)	(1)	(1)	(1)	(1)							
New York	179	29,366	231,389	1	7	4.32	30.25	3,804	862,012	6,716,039	1	147	.15	21.89							
North Carolina	361	84,891	679,128		16		23.56	659	152,998	1,241,118		51		41.09							
Ohio	596	140,845	1,126,991		31		27.51	4,908	1,212,155	9,504,707	3	191	.32	20.10	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Oklahoma	72	18,734	149,875		9		60.05	812	203,239	1,553,877		25		16.09	(1)	(1)	(1)	(1)	(1)	(1)	(1)

Oregon	(1)	(1)	(1)	(1)	(1)	(1)	(1)	505	94,789	719,440		57		79.23								
Pennsylvania	1,492	351,984	2,845,614		217		76.26	11,407	2,877,892	21,538,819	3	516	.14	23.96	145	32,806	291,865		12		41.11	
Rhode Island	121	25,498	203,984		9		44.12	76	13,208	99,600		16		160.64								
South Carolina	(1)	(1)	(1)	(1)	(1)	(1)	(1)	460	121,513	967,191	1	90	1.03	93.05								
South Dakota	119	31,189	249,502		16		64.13	426	59,154	444,273		16		36.01								
Tennessee	1,218	313,708	2,533,503		224		88.42	1,628	406,675	3,120,900		127		40.69	120	26,927	252,049		3		11.90	
Texas	135	32,122	248,725	1	14	4.02	56.29	1,797	463,725	3,468,943	3	63	.86	18.16	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
Utah								240	59,907	439,080		33		75.16								
Vermont	2,251	549,727	4,360,735	3	238	.69	54.58	281	67,527	542,791		38		70.01	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
Virginia	383	88,728	777,364		26		33.45	2,879	717,893	5,488,423	2	329	.36	59.94	54	11,919	98,996		8		80.81	
Washington	(1)	(1)	(1)	(1)	(1)	(1)	(1)	1,145	294,961	2,277,615		118		51.81	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
West Virginia	87	11,196	89,588		20		223.24	1,590	401,726	3,178,902	1	60	.31	18.87	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
Wisconsin	550	115,280	917,741	1	70	1.09	76.27	774	148,173	1,187,033		77		64.87	78	16,325	130,757		30		229.43	
Wyoming	(1)	(1)	(1)	(1)	(1)	(1)	(1)	238	51,861	414,891		28		67.49								
Other States	244	41,793	335,700		14		41.70	430	104,241	838,261	1	24	1.19	28.63	252	38,880	311,597	1	15	3.21	48.14	
Total	14,397	3,214,203	25,722,980	10	1,380	.39	53.65	63,521	15,146,423	115,679,673	37	3,749	.32	32.41	1,531	365,454	2,443,930	1	75	.41	30.69	

[1] Included in "Other States."

TABLE 31.—*Dimension-stone and nondimension-stone quarries: Men employed, man-days, man-hours, number killed and injured, and rates per million man-hours, by States, **inside** the quarries, during the year ended Dec. 31, 1939*

State	Dimension stone							Nondimension stone							All other and not stated						
	Men employed	Man-days	Man-hours	Killed	Injured	Rate		Men employed	Man-days	Man-hours	Killed	Injured	Rate		Men employed	Man-days	Man-hours	Killed	Injured	Rate	
						Killed	Injured						Killed	Injured						Killed	Injured
Alabama	141	27,534	224,083		20		89.25	726	179,331	1,340,247		58		43.28	77	20,441	163,531		1		6.12
Arizona	(1)	(1)	(1)	(1)	(1)	(1)	(1)	145	40,835	320,130		6		18.74							
Arkansas	(1)	(1)	(1)	(1)	(1)	(1)	(1)	91	19,493	153,224		22		143.58							
California	79	9,819	73,594		2		27.18	846	183,223	1,429,767	2	128	1.40	89.53	404	114,153	573,924		2		3.48
Colorado	109	24,909	181,015		6		33.15	153	27,982	206,852	2	36	9.67	174.04	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Connecticut	54	8,601	68,829		4		58.12	241	61,703	506,097	1	26	1.98	51.37	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Delaware								(1)	(1)	(1)	(1)	(1)	(1)	(1)							
Florida	(1)	(1)	(1)	(1)	(1)	(1)	(1)	327	74,144	654,960	1	78	1.53	119.09							
Georgia	444	95,809	765,480	1	24	1.31	31.35	320	79,122	640,106	1	20	1.56	31.24							
Idaho	(1)	(1)	(1)	(1)	(1)	(1)	(1)	52	4,908	36,587		3		82.00							
Illinois	(1)	(1)	(1)	(1)	(1)	(1)	(1)	1,861	386,364	2,701,504	2	106	.74	39.24	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Indiana	613	128,820	1,030,637		73		70.83	837	154,072	1,201,017		80		66.61	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Iowa	(1)	(1)	(1)	(1)	(1)	(1)	(1)	434	67,059	572,596		24		41.91	62	15,862	113,863		2		17.56
Kansas	(1)	(1)	(1)	(1)	(1)	(1)	(1)	642	92,475	736,957		34		46.14	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Kentucky	(1)	(1)	(1)	(1)	(1)	(1)	(1)	887	162,039	1,395,609		109		78.10	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Louisiana								(1)	(1)	(1)	(1)	(1)	(1)	(1)							
Maine	451	55,405	443,048		29		65.46	90	16,894	135,597		9		66.37							
Maryland	99	24,587	211,704		23		108.64	363	77,731	655,815	1	48	1.52	73.19	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Massachusetts	206	38,282	302,737		4		13.21	416	92,549	749,175		54		72.08							
Michigan								1,003	212,811	1,716,351		38		22.14	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Minnesota	255	61,394	484,092	1	17	2.07	35.12	369	36,428	304,301		34		111.73	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Mississippi								(1)	(1)	(1)	(1)	(1)	(1)	(1)							
Missouri	97	19,261	143,729		25		173.94	1,909	330,382	2,352,175	1	208	.43	88.43	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Montana	(1)	(1)	(1)	(1)	(1)	(1)	(1)	462	77,758	623,652		38		60.93							
Nebraska								79	17,203	125,747		3		23.86							
Nevada								(1)	(1)	(1)	(1)	(1)	(1)	(1)							
New Hampshire	72	13,089	104,560		1		9.56	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
New Jersey	(1)	(1)	(1)	(1)	(1)	(1)	(1)	472	105,220	819,987		44		53.66							
New Mexico								(1)	(1)	(1)	(1)	(1)	(1)	(1)							
New York	154	23,829	187,093	1	5	5.34	26.72	1,499	312,290	2,454,090	1	90	.41	36.67							
North Carolina	109	24,729	197,832		5		25.27	422	96,171	785,248		42		53.49							
Ohio	263	56,631	453,283		16		35.30	1,954	398,019	3,252,198	2	94	.61	28.90	(1)	(1)	(1)	(1)	(1)	(1)	(1)

Oklahoma	(1)	(1)	(1)	(1)	(1)	(1)	(1)	347	80,630	636,902		20		31.40	(1)	(1)	(1)	(1)	(1)	(1)
Oregon	(1)	(1)	(1)	(1)	(1)	(1)	(1)	250	50,760	400,950		56		139.67						
Pennsylvania	550	123,524	1,011,333		100		98.88	4,184	913,563	7,402,567	3	386	.41	52.14	51	11,052	96,959		7	72.20
Rhode Island	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)						
South Carolina	(1)	(1)	(1)	(1)	(1)	(1)	(1)	267	71,159	560,886	1	73	1.78	130.15						
South Dakota	55	14,496	115,958		9		77.61	269	32,488	257,988		16		62.02						
Tennessee	651	161,645	1,324,965		138		104.15	568	123,245	979,777		79		80.63	96	22,613	203,017		3	14.78
Texas	74	16,736	125,362	1	3	7.98	23.93	361	82,068	595,850	1	18	1.68	30.21	(1)	(1)	(1)	(1)	(1)	(1)
Utah								79	15,946	119,866		19		158.51						
Vermont	1,273	303,992	2,390,328	3	172	1.26	71.96	88	20,970	169,959		12		70.61	(1)	(1)	(1)	(1)	(1)	(1)
Virginia	105	23,541	204,756		13		63.49	1,507	355,916	2,776,278	2	226	.72	81.40	(1)	(1)	(1)	(1)	(1)	(1)
Washington	(1)	(1)	(1)	(1)	(1)	(1)	(1)	550	119,151	918,390		87		94.73	(1)	(1)	(1)	(1)	(1)	(1)
West Virginia	64	8,489	67,932		20		294.41	792	190,287	1,492,243		32		21.44	(1)	(1)	(1)	(1)	(1)	(1)
Wisconsin	277	62,904	498,730	1	34	2.01	68.17	472	83,174	652,553		60		91.95	71	14,766	118,295		28	236.70
Wyoming	(1)	(1)	(1)	(1)	(1)	(1)	(1)	104	17,331	138,650		8		57.70						
Other States	238	40,089	320,968		16		49.85	199	39,964	283,697	1	33	3.52	116.32	269	44,553	376,602	1	16	2.66	42.49
Total	6,433	1,368,115	10,932,048	8	759	0.73	69.43	26,637	5,502,858	43,256,545	22	2,557	0.51	59.11	1,030	243,440	1,646,191	1	59	0.61	35.84

[1] Included in "Other States."

TABLE 32.—*Dimension-stone and nondimension-stone quarries: Nonfatal injury rates, by causes, compared on a per million man-hour basis for the years ended Dec. 31, 1937 to 1939*

Cause of accident	Dimension stone			Nondimension stone		
	1937	1938	1939	1937	1938	1939
OPEN QUARRY						
1. Falls or slides of rock or overburden	4.24	2.33	3.57	4.92	5.90	6.37
2. Handling materials	17.85	17.98	14.59	18.73	17.27	18.06
3. Hand tools	6.01	5.39	5.51	3.36	3.75	3.17
4. Explosives	.35	.53	.29	1.05	1.23	1.23
5. Haulage	1.50	1.59	2.12	5.32	4.24	4.89
6. Falls of persons	5.48	7.62	9.66	6.33	6.15	5.42
7. Falling objects (other than 1 and 2)	3.18	3.49	4.44	2.56	1.72	1.82
8. Flying objects	9.54	9.52	10.24	6.53	7.24	7.42
9. Electricity		.10	.10	.24	.38	.33
10. Drilling and channeling (by machine or hand)	4.51	4.23	3.77	2.54	3.28	2.22
11. Machinery	5.92	5.82	5.12	4.61	3.58	4.58
12. Stepping on nail	.71	.63	.58	.49	.27	.23
13. Boiler and air-tank explosions		.10				.10
14. Burns	.53	1.59	.58	.82	1.15	.64
15. Other causes	7.60	5.18	8.31	3.59	3.69	4.22
Total, at open quarry	67.42	66.10	68.88	61.09	59.85	60.70
UNDERGROUND QUARRY						
1. Fall of rock from roof or wall	3.27	5.44	1.72	10.19	7.66	4.33
2. Rock while loading at working face or chute	3.27	5.44	3.44	19.40	16.15	12.49
3. Hand tools	8.18	8.16	13.77	1.76	1.37	5.29
4. Explosives	3.27	2.72	3.44	1.57	.82	1.20
5. Haulage	8.18		3.44	4.90	4.10	4.08
6. Falling down chute, winze, raise, or stope	1.64		1.72	1.37		.72
7. Run of rock, from chute or pocket				.98	1.92	2.64
8. Drilling	4.91	8.16	12.04	4.51	3.83	6.01
9. Electricity						
10. Machinery (other than locomotives or drills)	1.64		1.72	2.74	1.92	1.44
11. Mine fires						
12. Suffocation from natural gases				.20		
13. Inrush of water						
14. Stepping on nail			1.72	.20	1.64	
15. Handling materials (other than rock)	4.91	2.72	6.88	3.72	2.19	2.16
16. Other causes	22.91	8.16	29.25	7.25	6.30	3.60
Total, at underground quarry	62.19	40.80	79.14	58.79	47.90	43.96
SHAFT OR SLOPE						
17. Falling down shaft or slope						
18. Objects falling down shaft or slope					.27	.24
19. Breaking of cables					.55	
20. Overwinding						
21. Cage, skip, or bucket	1.63			.19		
22. Other causes				.19	.55	
Total, in shaft or slope	1.63			.39	1.37	.24
Total underground (including shaft)	63.82	40.80	77.42	59.18	49.27	44.20
OUTSIDE WORKS						
1. Haulage	3.40	1.85	2.09	1.57	1.44	.87
2. Machinery	4.66	4.90	4.94	2.79	3.32	2.83
3. Hand tools	4.53	3.64	4.12	1.34	1.68	1.37
4. Stepping on nail	.44	.37	.27	.30	.21	.15
5. Electricity	.13			.38	.24	.41
6. Falls of persons	3.53	2.45	2.57	2.29	2.15	1.67
7. Falling objects (rocks, timbers, etc.)	4.34	3.93	3.99	1.71	1.62	1.41
8. Flying objects	12.03	7.94	6.36	2.20	1.87	1.39
9. Handling materials	10.70	9.57	11.97	3.35	2.70	2.79
10. Burns	.25	.37	.61	1.57	1.62	1.51
11. Other causes	4.41	3.49	5.07	3.26	3.00	2.06
Total, at outside works	48.42	38.51	41.99	20.76	19.85	16.46
Grand total	56.49	49.74	53.65	36.38	34.45	32.41
MAN-HOURS OF EMPLOYMENT						
Open quarries	11,317,886	9,455,536	10,350,812	44,898,390	36,588,796	39,093,575
Underground quarries	611,058	367,695	581,236	5,102,803	3,653,270	4,162,970
At outside works	15,881,299	13,467,991	14,790,932	78,569,374	67,351,700	72,423,128
Total	27,810,243	23,300,222	25,722,980	128,510,567	107,593,766	115,679,673

NONFATAL-INJURY RATES FROM 7 MAIN CAUSES OF ACCIDENTS INSIDE OPEN-QUARRYING OPERATIONS IN THE 10 LEADING QUARRYING STATES

Approximately 40 percent of all men employed in quarrying and related work in 1939 worked inside the quarries at open-quarry operations. These employees suffered 29 fatalities and 3,145 nonfatal injuries, which comprised 60 percent of the total number of fatalities and injuries at all plants. The accident-prevention problem of the quarrying industry therefore lies principally within the field of work performed by inside employees at open quarries. Most of the injuries that are reported from year to year among employees of this class may be assigned to seven main causes of accidents. These causes are listed in table 33. Because of the importance of the seven classes of accidents in determining the accident rate for the quarrying industry as a whole, accidents falling under these classes are shown on a comparative basis for the 10 States having the largest number of men employed inside the open quarries in 1939. The table covers nonfatal injuries only, and the rates show the number of injuries per million man-hours of work performed inside the open quarries.

As shown in table 33, more accidents resulted from handling materials than from any other cause. The frequency rate for accidents of this class throughout the United States was 17.34 per million man-hours. Compared with this average rate for the entire country the rate of 4.63 for Ohio and 4.65 for California was particularly favorable. Accidents from flying objects resulted in an average rate of 7.94 per million man-hours; the rate for similar accidents in New York, Illinois, and Ohio was most favorable. The next most numerous class of accidents was falls of persons, for which the national rate was 6.25 and for which a more favorable rate was reported by Illinois and Missouri. Falls or slides of rock or overburden were represented by a frequency rate of 5.64 for the United States, with a particularly favorable rate reported for injuries of this class at quarries in Illinois and New York. The United States rate was 4.58 for accidents caused by machinery; the rate for Ohio was only 2.03. Haulage accidents in the United States showed an injury rate of 4.21, whereas the rate for these accidents in Vermont was only 0.46 and in New York only 1.97. Hand-tool accidents in the United States resulted in an average rate of 3.62; the rate for similar accidents in Illinois, Ohio, and Indiana was decidedly more favorable. (See table 33.)

TABLE 33.—*Nonfatal-injury rates per million man-hours of employment* ***inside*** *open quarries, during the year ended Dec. 31, 1939, in principal quarrying States, by chief causes of accidents*

Cause	United States	Pennsylvania	Ohio	Illinois	Missouri	Virginia	New York	Indiana	Tennessee	Vermont	California
Handling materials	17.34	22.57	4.63	16.63	31.37	18.33	6.69	20.25	12.20	25.11	4.65
Flying objects	7.94	6.06	3.47	3.09	16.73	14.67	2.36	7.20	20.92	10.23	7.55
Falls of persons	6.25	8.75	5.79	4.25	4.70	7.00	5.91	6.30	13.07	6.98	7.55
Falls or slides of rock or overburden	5.64	3.95	4.34	2.32	14.64	11.67	2.76	4.05	5.23	3.26	5.81
Machinery	4.58	3.95	2.03	3.48	9.41	3.00	3.15	6.75	8.28	5.12	2.33
Haulage	4.21	6.21	3.47	2.71	8.36	9.00	1.97	3.60	2.61	.46	6.39
Hand tools	3.62	2.68	.87	.39	2.61	3.33	1.18	.90	11.76	3.72	4.07
Total, chief causes	49.58	54.17	24.60	32.87	87.82	67.00	24.02	49.05	74.07	54.88	38.35
All other causes	12.03	11.28	7.24	6.57	13.59	14.00	12.21	17.10	15.25	14.42	13.36
Total, open quarry	61.61	65.45	31.84	39.44	101.42	81.00	36.23	66.15	89.32	69.30	51.71

COMPARATIVE SEVERITY OF INJURIES

Accidents caused by the hazards to which industrial workers are exposed generally are classified in four main groups: Deaths, permanent total disabilities, permanent partial disabilities, and temporary disabling or lost-time injuries. Two other classes are added by some agencies, especially by a few large operating companies that keep a full record of safety conditions surrounding their employees; these two classes cover injuries from which the employee recovers quickly and returns to work on the day following the injury and injuries that only partly disable an employee yet are not serious enough to prevent him from doing some work at the plant. Accident reports furnished by operating companies to the Bureau of Mines do not cover the last two classes of injuries.

Reports received during the past 5 years (1935–39) show that 26,797 lost-time or disabling injuries, both fatal and nonfatal, were caused by accidents at quarries and related plants in the United States. A classification of these accidents shows that, of every 1,000 reported, 958 caused temporary injuries from which the employee recovered and was able to resume work without having lost the use of any part of his body. A smaller number of accidents, averaging 28 out of each 1,000, resulted in more serious injuries known as permanent partial disabilities, as they caused the dismemberment or the loss of use of some part of the body. One out of each 1,000 accidents disabled the employee completely and permanently. These injuries were therefore classified as permanent total disabilities, as they prevented the employees from engaging in any gainful occupation. In 13 out of each 1,000 accidents the employees lost their lives.

This classification of accidents during the past 5 years is probably a fair representation of the relative severity of injuries to men employed in the quarrying industry. The distribution did not differ notably from that covering a previous 5-year period (1930–34), when the reports indicated that 954 injuries out of each 1,000 were temporary, 32 were permanent partial disabilities, 1 was a permanent total disability, and 13 caused the death of the injured workers. (See table 34.)

RATIO OF INJURIES TO FATALITIES

Accidents at quarries and related plants in 1939 occurred at the rate of 108 nonfatal injuries to 1 fatality. Among employees inside the quarries the ratio was 109 injuries to 1 death. For employees at plants outside the quarries, such as crushing and finishing plants, cement mills, and limekilns, the ratio was 108 to 1.

Falls or slides of rock or overburden in open quarries, one of the chief hazards to which quarry workers are exposed, had a ratio of 36 injuries to each fatality.

Table 11 shows the number of deaths and injuries from each of the important causes of accidents in the quarrying industry in 1939, and from these figures the mortality ratio for each cause may be determined.

TABLE 34.—*All quarries: Number of fatalities and injuries, and fatality and injury rates, per million man-hours of employment, classified by severity of injury, 1930–39*

NUMBER OF QUARRY ACCIDENTS

Severity of injury	Total, 1930–34	1935	1936	1937	1938	1939	Total, 1935–39
Fatal	317	51	91	77	82	48	349
Permanent total [1]	38	7	8	4	5	8	32
Permanent partial [2]	770	122	171	173	153	141	760
Temporary [3]	23,171	4,023	5,538	6,171	4,869	5,055	25,656
Total	24,296	4,203	5,808	6,425	5,109	5,252	26,797

RATES PER MILLION MAN-HOURS OF EMPLOYMENT [4]

Fatal	0.531	0.464	0.619	0.487	0.613	0.334	0.504
Permanent total [1]	.063	.063	.054	.025	.037	.055	.046
Permanent partial [2]	1.290	1.109	1.163	1.093	1.144	.980	1.097
Temporary [3]	38.805	36.562	37.657	38.983	36.399	35.142	37.021
Total	40.689	38.198	39.493	40.588	38.194	36.511	38.668
Number of employees per year	66,591	73,005	80,022	84,094	77,497	79,449	78,813

[1] Permanent total disability: Loss of both legs or arms, 1 leg and 1 arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.
[2] Permanent partial disability: Loss of 1 foot, leg, hand, or eye, 1 or more fingers, 1 or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.
[3] Disability for more than remainder of day of accident.
[4] Accident rates for 1930–34 computed on basis of man-hours worked, the number of man-hours for 1930 being estimated by assuming that all companies operated the same number of hours per man per day as did those companies actually reporting length of day.

UNDERGROUND QUARRIES

Although quarrying is predominantly an above-ground method of operation, the Bureau of Mines canvass of the quarrying industry in 1939, covering 2,128 quarries, showed that 107 properties were underground quarries or mines. Eighty-four of these were mines that produced limestone or cement rock; the other mines produced marble, sandstone, granite, slate, or trap rock. The largest number of employees underground was reported for Pennsylvania, where 23 mines employed 773 men underground in 1939; thus the State ranked first in number of operations and number of men employed underground. Missouri ranked second, with 21 plants and 377 underground employees.

The combined accident-frequency rate for all underground quarries that were active in 1939 was 48.43 per million man-hours of employment underground. This rate showed an improvement over 1937 and 1938. The total number of underground employees at underground operations was only 2,611 men, whose aggregate working time was nearly 5 million man-hours—an average of 231 workdays or 1,835 man-hours per underground worker. Two fatalities and 230 nonfatal lost-time injuries were caused by accidents at underground quarries during the year. (See tables 8, 9, and 35.)

TABLE 35.—*Accident data for underground quarries in the United States in 1939*

[Data cover underground and shaft operations only]

UNDERGROUND QUARRIES, BY KINDS OF STONE

	Number of plants	Men employed	Man-days of employment	Man-hours of employment	Average days of employment per man	Average hours of employment per man	Accidents		
							Killed	Injured	Rate per million man-hours
Cement[1] and limestone[2]	84	2,202	512,827	4,061,746	233	1,845	2	181	45.05
Marble	4	222	55,850	446,796	252	2,013		37	82.81
Sandstone and granite	6	74	14,333	114,630	194	1,549		4	34.89
Slate and trap rock	13	113	20,732	167,701	183	1,484		8	47.70
Total	107	2,611	603,742	4,790,873	231	1,835	2	230	48.43

UNDERGROUND QUARRIES, BY STATES

California	9	176	45,189	356,137	257	2,024	1	43	123.55
Illinois	6	92	25,432	197,486	276	2,147		5	25.32
Kentucky	8	99	15,525	130,012	157	1,313		15	115.37
Missouri	21	377	84,090	633,223	223	1,680		43	67.91
Ohio	5	140	31,520	252,342	225	1,802		1	3.96
Pennsylvania	23	773	177,317	1,421,840	229	1,839	1	29	21.10
Tennessee	6	127	27,091	212,729	213	1,675		15	70.51
Vermont	3	207	52,308	418,464	253	2,022		35	83.64
West Virginia	6	272	71,918	583,397	264	2,145		13	22.28
Other States[3]	20	348	73,352	585,243	211	1,682		31	52.97
Total	107	2,611	603,742	4,790,873	231	1,835	2	230	48.43

[1] Includes limestone and other stone used in the manufacture of cement.
[2] Includes quarries that produce limestone used chiefly for making lime.
[3] Includes Alabama, Colorado, Georgia, Indiana, Iowa, Kansas, Maine, Maryland, New York, Rhode Island, Virginia, Washington, and Wyoming.

TABLE 36.—*Accident rates, men employed, etc., at cement* **mills** *(including crushers and miscellaneous work) during the year ended Dec. 31, 1939*

State	Men employed	Man-days of employment	Average days of employment per man	Man-hours of employment	Killed	Permanent total	Permanent partial	Temporary	Total nonfatal	Killed per million man-hours	Injured per million man-hours
Alabama	868	227,177	262	1,560,497			1	12	13		8.33
California	1,426	421,351	295	3,218,405	2		1	87	88	0.62	27.34
Illinois	1,057	266,165	252	1,716,498			1	13	14		8.16
Indiana	1,063	308,743	290	2,265,823	2			2	2	.88	.88
Iowa	1,048	281,899	269	2,154,561			2	4	6		2.78
Kansas	732	191,635	262	1,486,586			1	1	2		1.35
Michigan	1,655	487,704	295	3,800,678			1	11	12		3.16
Missouri	862	254,979	296	1,787,305	1		1	2	3	.56	1.68
New York	1,390	361,694	260	2,736,894			3	3	6		2.19
Ohio	1,179	346,778	294	2,685,962			1	12	13		4.84
Pennsylvania	4,612	1,336,548	290	9,112,391			4	20	24		2.63
Tennessee	601	166,821	278	1,248,090			2	11	13		10.42
Texas	1,165	318,760	274	2,401,563	2		2	26	28	.83	11.66
Virginia	332	90,559	273	609,267				1	1		1.64
Washington	451	146,539	325	1,117,336			1	11	12		10.74
West Virginia	326	87,047	267	676,206			1	5	6		8.87
Other States[1]	3,482	907,692	261	6,673,958	1		2	70	72	.15	10.79
Total	22,249	6,202,091	279	45,252,020	8		24	291	315	.18	6.96

[1] Includes Arkansas, Colorado, Florida, Georgia, Idaho, Kentucky, Louisiana, Maine, Maryland, Minnesota, Montana, Nebraska, New Jersey, Oklahoma, Oregon, South Dakota, Utah, Wisconsin, and Wyoming.

TABLE 36.—*Accident rates, men employed, etc., at cement* ***mills*** *(including crushers and miscellaneous work) during the year ended Dec. 31, 1939*—Continued

Severity of injury	Haulage	Machinery	Hand tools	Stepping on nail	Electricity	Falls of persons	Falling objects (rocks timbers, etc.)	Flying objects	Handling materials	Burns	Other causes	Total
Killed		2				1	2			1	2	8
Permanent total												
Permanent partial	1	15			1	2	1	2	1	1		24
Temporary	18	51	20	1	10	41	27	23	41	32	27	291
Total nonfatal	19	66	20	1	11	43	28	25	42	33	27	315

PLANTS OPERATED WITHOUT FATAL ACCIDENTS

Among 2,128 active plants covered by reports for the past year, only 46 reported accidents that resulted in the death of an employee. Nearly 95 percent of all employees in the industry worked at plants that did not have a fatality. The plants that were free from fatal accidents included many large operations but, on the whole, were smaller than the plants at which the fatal accidents occurred, averaging 36 employees per plant compared with 89 at plants where the 48 fatalities occurred during 1939.

Thus the entire fatality toll of the quarrying industry during 1939 can be credited to a relatively small number of plants.

Tables 37 to 39 show the proportion of the quarrying industry in each State and in the United States as a whole that was free from fatal accidents in 1939.

TABLE 37.—*Comparative fatal and nonfatal accident data for the quarrying and related industries in the United States during the year ended Dec. 31, 1939*

	Plants that had no fatal accidents	Plants that had fatal accidents	All plants
Number of plants	2,082	46	2,128
Number of employees	75,358	4,091	79,449
Proportion of total employees—percent	94.9	5.1	100.0
Number of employees per plant	36	89	37
Man-days of employment	17,585,660	1,140,420	18,726,080
Average worked per man—days	233	279	236
Man-hours of emlpoyment	134,745,058	9,101,525	143,846,583
Average worked per man—hours	1,788	2,225	1,811
Number of men killed		48	48
Number of men injured	4,887	317	5,204
Death rate per million man-hours		5.27	.33
Injury rate per million man-hours	36.27	34.83	36.18

TABLE 38.—*Quarries and related plants: Number of men employed in 1939*

State	At plants that had fatalities	At plants that had no fatalities	Employees represented by plants that had no fatalities, percent	State	At plants that had fatalities	At plants that had no fatalities	Employees represented by plants that had no fatalities, percent
Michigan		3,442	100.0	Pennsylvania	233	12,811	98.2
Tennessee		2,966	100.0	Kentucky	25	1,393	98.2
Iowa		1,666	100.0	Vermont	53	2,483	97.9
Kansas		1,557	100.0	Alabama	51	2,337	97.9
Washington		1,198	100.0	Virginia	99	3,217	97.0
New Jersey		1,092	100.0	Connecticut	20	466	95.9
Maine		1,086	100.0	West Virginia	77	1,612	95.4
North Carolina		1,020	100.0				
Oklahoma		901	100.0	United States	4,091	75,358	94.9
Montana		579	100.0				
South Dakota		545	100.0	Maryland	57	949	94.3
Oregon		516	100.0	Florida	45	731	94.2
Nebraska		319	100.0	Ohio	362	5,148	93.4
New Hampshire		261	100.0	Illinois	253	3,453	93.2
Arkansas		243	100.0	Wisconsin	99	1,303	92.9
Wyoming		243	100.0	Missouri	328	3,553	91.5
Arizona		242	100.0	Other States [1]	52	336	86.6
Utah		240	100.0	Texas	281	1,668	85.6
Rhode Island		197	100.0	Colorado	85	451	84.1
Idaho		147	100.0	Indiana	699	3,536	83.5
Minnesota	15	1,566	99.1	California	706	2,811	79.9
New York	52	3,931	98.7	Georgia	375	1,494	79.9
Massachusetts	20	1,290	98.5	South Carolina	104	359	77.5

[1] Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

TABLE 39.—*Quarries and related plants: Number of man-hours of employment in 1939*

State	At plants that had fatalities	At plants that had no fatalities	Man-hours represented by plants that had no fatalities, percent	State	At plants that had fatalities	At plants that had no fatalities	Man-hours represented by plants that had no fatalities, percent
Michigan		6,966,696	100.0	Alabama	79,423	4,344,246	98.2
Tennessee		5,906,452	100.0	Pennsylvania	548,883	24,127,415	97.8
Iowa		2,990,049	100.0	Vermont	113,135	4,798,711	97.7
Kansas		2,501,361	100.0	Kentucky	61,600	2,289,506	97.4
Washington		2,346,972	100.0	Virginia	197,770	6,167,013	96.9
New Jersey		1,981,891	100.0	Maryland	80,400	1,670,286	95.4
North Carolina		1,920,246	100.0	Connecticut	45,232	913,530	95.3
Oklahoma		1,711,164	100.0				
Maine		1,263,528	100.0	United States	9,101,525	134,745,058	93.7
Montana		830,750	100.0				
Oregon		728,010	100.0	West Virginia	213,320	3,056,898	93.5
South Dakota		693,775	100.0	Illinois	415,815	5,244,889	92.7
Nebraska		620,421	100.0	Ohio	938,509	9,697,899	91.2
Arizona		533,042	100.0	Missouri	588,011	5,670,301	90.6
Arkansas		449,423	100.0	Wisconsin	218,592	2,016,939	90.2
Utah		439,080	100.0	Florida	156,000	1,268,284	89.0
Wyoming		421,211	100.0	Other States [1]	108,160	709,185	86.8
New Hampshire		386,004	100.0	Texas	603,191	3,127,679	83.8
Rhode Island		303,584	100.0	Colorado	153,570	755,537	83.1
Idaho		147,429	100.0	Indiana	1,675,174	5,779,559	77.5
Massachusetts	22,400	2,385,514	99.1	Georgia	820,084	2,507,777	75.4
New York	89,673	6,857,755	98.7	South Carolina	242,188	730,211	75.1
Minnesota	34,200	2,581,690	98.7	California	1,696,195	4,903,146	74.3

[1] Includes Delaware, Louisiana, Mississippi, Nevada, and New Mexico.

LONG-TIME TREND OF ACCIDENT RATES IN THE QUARRY INDUSTRY

The first year for which the Bureau of Mines collected reports of accidents from all quarrying companies in the United States was 1911. Since then reports have been collected annually. The present bulletin is therefore the twenty-ninth annual publication containing statistical data on accidents in the quarrying industry.

Reports from operating companies for 1911 and several years immediately thereafter, although apparently complete in coverage of fatal accidents, did not appear complete for nonfatal injuries; hence the total number of injuries in the United States, as compiled from the reports, probably did not cover all injuries that actually occurred. This is evidenced by the rapid increase in the number of injuries reported for the several years following 1911, which was too large to be accounted for solely by an increase in the accident-frequency rates based upon the number of men employed.

Insofar as may be judged, the number of reported nonfatal injuries could not be considered complete until 1916. Probably the reports before 1916 were incomplete chiefly as to injuries of a slight nature that disabled the injured worker for only a day or two. Such injuries might have been overlooked or forgotten by the operator when he made his report to the Bureau of Mines, although deaths and serious injuries would have been recorded.

In 1916, when the compiled totals covering all reporting companies seemed to be reasonably complete as to injuries as well as deaths, the reports showed 173 fatalities and 13,427 nonfatal injuries at quarries and related outside works. The number of man-hours of employment or exposure to occupational risk, as determined from the reports, was 214,692,000. The accident rate for 1916 was therefore 63.35 per million man-hours of exposure. This figure included a fatality rate of 0.81 and an injury rate of 62.54.

From 1916 to 1930 the nonfatal-injury rates showed a gratifying downward trend. There was little change from 1930 to 1937. Since 1937 the nonfatal-injury rate has declined. The trend of the yearly fatality rates also was downward from 1916 until 1932. The 1933 rate, although the highest in recent years, was by no means as high as the 1916 rate. Since then, although the rates have fluctuated, they have not again risen to the level of 1933, and the fatality rate for 1939 was the lowest on record. (See table 40 and fig. 1.)

TABLE 40.—*Employment and accident data for the quarrying and related industries in the United States, 1911–39*

Year	Men employed	Average days of employment per man	Man-days of employment	Average hours of employment per day per man	Man-hours[1] of employment	Killed	Injured	Rates per million man-hours	
								Killed	Injured[2]
1911	110,954	228	25,325,094	.....	237,043,000	188	5,390	0.79	22.74
1912	113,105	249	28,151,042	.....	263,494,000	213	6,552	.81	24.87
1913	106,278	246	26,142,237	.....	244,691,000	183	7,739	.75	31.63
1914	87,936	233	20,456,157	.....	191,470,000	180	7,836	.94	40.93
1915	100,740	246	24,734,224	.....	231,512,000	148	9,671	.64	41.77
1916	90,797	253	22,937,178	.....	214,692,000	173	13,427	.81	62.54
1917	82,290	261	21,457,357	.....	200,841,000	131	13,242	.65	65.93
1918	68,332	260	17,785,504	.....	166,472,000	125	8,719	.75	52.38
1919	75,505	253	19,138,308	.....	179,135,000	123	9,199	.69	51.35
1920	86,488	267	23,126,648	.....	216,465,000	178	11,217	.82	51.82
1921	77,185	233	17,987,547	.....	168,363,000	120	10,465	.71	62.16
1922	79,081	261	20,658,338	.....	193,362,000	132	11,839	.68	61.23
1923	92,455	276	25,545,859	.....	239,109,000	143	14,990	.60	62.69
1924	94,242	269	25,327,858	9.36	236,982,774	138	14,777	.58	62.35
1925	91,872	273	25,045,955	9.31	233,222,241	149	14,165	.64	60.74
1926	91,146	271	24,708,400	9.33	230,464,089	154	13,201	.67	57.28
1927	91,517	271	24,782,561	9.27	229,805,889	135	13,459	.59	58.57
1928	89,667	272	24,397,377	9.22	224,953,034	119	10,568	.53	46.98
1929	85,561	268	22,967,579	9.22	211,765,529	126	9,810	.59	46.32
1930	80,633	255	20,559,372	9.07	186,502,184	105	7,417	.56	39.77
1931	69,200	224	15,526,503	8.61	133,750,124	61	5,427	.46	40.58
1932	56,866	195	11,114,135	8.43	93,709,860	32	3,574	.34	38.14
1933	61,927	183	11,362,151	7.74	87,888,263	59	3,637	.67	41.38
1934	64,331	204	13,108,274	7.27	95,258,880	60	3,924	.63	41.19
1935	73,005	200	14,623,303	7.52	110,033,341	51	4,152	.46	37.73
1936	80,022	236	18,874,254	7.79	147,064,448	91	5,717	.62	38.87
1937	84,094	241	20,264,125	7.81	158,298,530	77	6,348	.49	40.10
1938	77,497	223	17,255,828	7.75	133,766,111	82	5,027	.61	37.58
1939	79,449	236	18,726,080	7.68	143,846,583	48	5,204	.33	36.18

[1] Man-hours for 1911–23 computed on assumption that weighted average length of workday was 9.36 hours, as shown by reports from representative operating companies for 1924.

[2] Injury rates for years previous to 1916 are believed not to be representative owing to probable incompleteness of reports of slight or minor injuries.

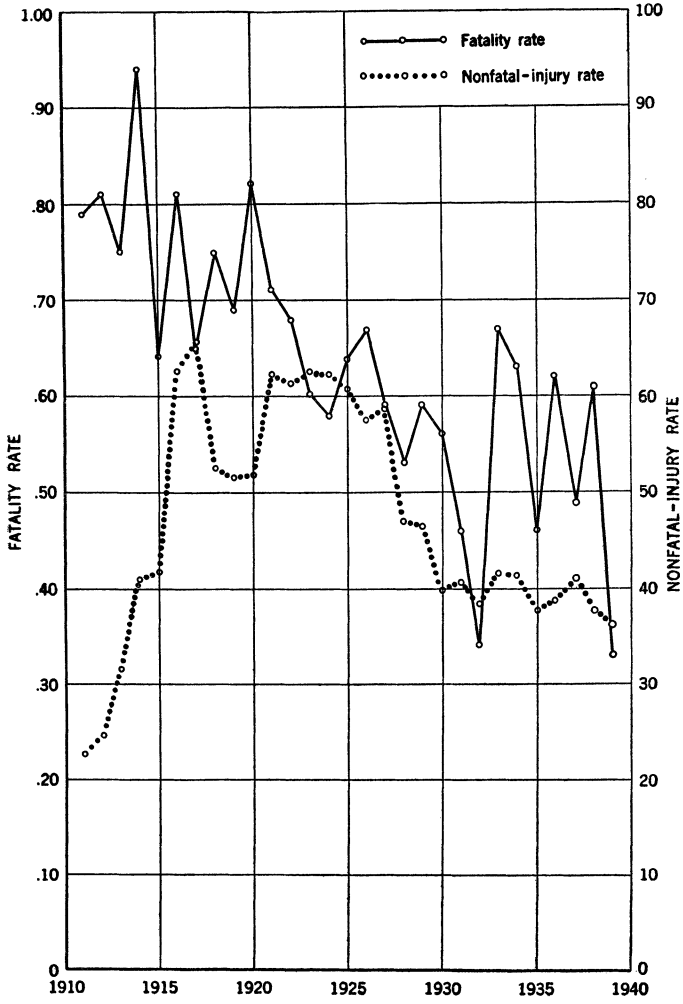

FIGURE 1.—Accident-frequency rates per million man-hours of employment in the quarrying and related industries in the United States, 1911–39.

TABLE 41.—*All quarries: Accident and labor data, by kinds of quarries, during the years ended Dec. 31, 1935 to 1939*

Kind of quarry	Men employed			Man-days of employment			Average days of employment per man		
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
Cement rock: [1]									
1935	3,860	20,556	24,416	746,151	4,800,032	5,546,183	193	234	227
1936	4,402	21,602	26,004	1,073,338	5,993,269	7,066,607	244	277	272
1937	4,334	22,881	27,215	1,042,005	6,521,786	7,563,791	240	285	278
1938	3,874	21,646	25,520	843,150	5,672,710	6,515,860	218	262	255
1939	3,796	22,249	26,045	889,510	6,202,091	7,091,601	234	279	272
Granite:									
1935	4,040	2,837	6,877	818,517	567,512	1,386,029	203	200	202
1936	4,779	3,464	8,243	1,068,877	775,836	1,844,713	224	224	224
1937	5,209	3,752	8,961	1,153,001	875,321	2,028,322	221	233	226
1938	4,928	3,467	8,395	1,045,587	753,228	1,798,815	212	217	214
1939	4,934	3,456	8,390	1,072,951	791,998	1,864,949	217	229	222
Limestone:									
1935	15,887	6,895	22,782	2,435,888	1,179,430	3,615,318	153	171	159
1936	16,743	7,545	24,288	3,127,705	1,578,890	4,706,595	187	209	194
1937	16,563	8,226	24,789	3,246,594	1,762,194	5,008,788	196	214	202
1938	14,416	7,936	22,352	2,603,904	1,570,571	4,174,475	181	198	187
1939	14,947	8,021	22,968	2,798,005	1,631,368	4,429,373	187	203	193
Limestone (chief product, lime):									
1935	3,300	4,891	8,191	858,259	1,331,175	2,189,434	260	272	267
1936	3,777	5,608	9,385	1,037,930	1,594,578	2,632,508	275	284	281
1937	4,205	6,155	10,360	1,151,626	1,757,662	2,909,288	274	286	281
1938	3,667	5,486	9,153	915,132	1,460,394	2,375,526	250	266	260
1939	3,828	5,804	9,632	1,036,899	1,673,846	2,710,745	271	288	281
Marble:									
1935	827	1,614	2,441	152,339	360,142	512,481	184	223	210
1936	932	2,372	3,304	195,952	632,770	828,722	210	267	251
1937	1,288	2,359	3,647	265,623	573,539	839,162	206	243	230
1938	1,305	2,109	3,414	291,257	508,728	799,985	223	241	234
1939	1,389	2,308	3,697	311,390	562,490	873,880	224	244	236
Sandstone:									
1935	1,801	938	2,739	279,635	177,582	457,217	155	189	167
1936	2,119	1,003	3,122	409,099	219,499	628,598	193	219	201
1937	2,225	1,017	3,242	444,175	218,378	662,553	200	215	204
1938	2,045	862	2,907	352,297	176,222	528,519	172	204	182
1939	2,221	892	3,113	407,347	186,587	593,934	183	209	191
Slate:									
1935	805	1,258	2,063	148,690	230,695	379,385	185	183	184
1936	907	1,658	2,565	203,540	382,482	586,022	224	231	228
1937	1,216	1,858	3,074	281,845	430,515	712,360	232	232	232
1938	1,043	1,572	2,615	202,096	308,623	510,719	194	196	195
1939	1,143	1,690	2,833	253,702	390,498	644,200	222	231	227
Trap rock:									
1935	2,109	1,387	3,496	322,536	214,720	537,256	153	155	154
1936	1,978	1,133	3,111	378,163	202,326	580,489	191	179	187
1937	1,839	967	2,806	353,177	186,684	539,861	192	193	192
1938	2,066	1,075	3,141	370,488	181,441	551,929	179	169	176
1939	1,842	929	2,771	344,609	172,789	517,398	187	186	187
Total:									
1935	32,629	40,376	73,005	5,762,015	8,861,288	14,623,303	177	219	200
1936	35,637	44,385	80,022	7,494,604	11,379,650	18,874,254	210	256	236
1937	36,879	47,215	84,094	7,938,046	12,326,079	20,264,125	215	261	241
1938	33,344	44,153	77,497	6,623,911	10,631,917	17,255,828	199	241	223
1939	34,100	45,349	79,449	7,114,413	11,611,667	18,726,080	209	256	236

[1] Includes limestone or other stone used in the manufacture of cement.

TABLE 42.—*All quarries: Accident and labor data, by kinds of quarries, during the years ended Dec. 31, 1935 to 1939*

Kind of quarry	Man-hours of employment			Number killed			Number injured			Rates per million man-hours					
										Killed			Injured		
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
Cement rock: [1]															
1935	5,305,243	33,937,775	39,243,018	3	9	12	90	272	362	0.57	0.27	0.31	16.96	8.01	9.22
1936	7,995,414	43,813,039	51,808,453	6	17	23	248	480	728	.75	.39	.44	31.02	10.96	14.05
1937	7,936,615	48,172,024	56,108,639	7	16	23	216	444	660	.88	.33	.41	27.22	9.22	11.76
1938	6,381,332	42,126,292	48,507,624	8	6	14	131	339	470	1.25	.14	.29	20.53	8.05	9.69
1939	6,752,394	45,252,020	52,004,414	4	8	12	142	315	457	.59	.18	.23	21.03	6.96	8.79
Granite:															
1935	6,151,107	4,404,309	10,555,416	6		6	431	139	570	.98		.57	70.07	31.56	54.00
1936	8,503,251	6,200,222	14,703,473	5		5	541	222	763	.59		.34	63.62	35.81	51.89
1937	9,079,863	7,002,884	16,082,747	7		7	555	307	862	.77		.44	61.12	43.84	53.60
1938	8,046,619	5,998,374	14,044,993	23	2	25	395	183	578	2.86	.33	1.78	49.09	30.51	41.15
1939	8,184,598	6,124,950	14,309,548	8		8	397	210	607	.98		.56	48.51	34.29	42.42
Limestone:															
1935	19,138,003	9,498,822	28,636,825	12	4	16	1,173	378	1,551	.63	.42	.56	61.29	39.79	54.16
1936	25,374,123	12,978,862	38,352,985	21	13	34	1,561	514	2,075	.83	1.00	.89	61.52	39.60	54.10
1937	26,105,531	14,614,095	40,719,626	16	7	23	1,655	518	2,173	.61	.48	.56	63.40	35.45	53.36
1938	20,765,959	12,746,989	33,512,948	16	6	22	1,379	513	1,892	.77	.47	.66	66.41	40.24	56.46
1939	22,431,234	13,308,589	35,739,823	8	6	14	1,387	356	1,743	.36	.45	.39	61.83	26.75	48.77
Limestone (chief product, lime):															
1935	6,464,768	10,095,798	16,560,566	8		8	491	370	861	1.24		.48	75.95	36.65	51.99
1936	8,134,208	12,516,668	20,650,876	7	5	12	598	520	1,118	.86	.40	.58	73.52	41.54	54.14
1937	8,906,160	13,579,755	22,485,915	7	3	10	647	572	1,219	.79	.22	.44	72.65	42.12	54.21
1938	6,951,358	11,140,144	18,091,502	7	7	14	509	427	936	1.01	.63	.77	73.22	38.33	51.74
1939	7,731,031	12,655,429	20,386,460	5	2	7	543	461	1,004	.65	.16	.34	70.24	36.43	49.25
Marble:															
1935	1,195,136	2,821,683	4,016,819		1	1	70	106	176		.35	.25	58.57	37.57	43.82
1936	1,602,717	5,098,903	6,701,620		2	2	85	165	250		.39	.30	53.03	32.36	37.30
1937	2,247,925	4,625,765	6,873,690				123	227	350				54.72	49.07	50.92
1938	2,462,034	4,096,528	6,558,562	1		1	190	192	382	.41		.15	77.17	46.87	58.24
1939	2,541,353	4,502,326	7,043,679				228	201	429				89.72	44.64	60.91
Sandstone:															
1935	2,242,757	1,445,378	3,688,135				202	41	243				90.07	28.37	65.89
1936	3,337,562	1,829,066	5,166,628	1		1	181	67	248	.30		.19	54.23	36.63	48.00
1937	3,678,045	1,833,076	5,511,121	3	1	4	294	117	411	.82	.55	.73	79.93	63.83	74.58
1938	2,868,458	1,465,071	4,333,529				203	49	252				70.77	33.45	58.15
1939	3,277,429	1,515,388	4,792,817				257	56	313				78.42	36.95	65.31

[1] Includes limestone and other stone used in the manufacture of cement.

TABLE 42.—*All quarries: Accident and labor data, by kinds of quarries, during the years ended Dec. 31, 1935 to 1939*—Continued

Kind of quarry	Man-hours of employment			Number killed			Number injured			Rates per million man-hours					
										Killed			Injured		
	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
Slate:															
1935	1,218,427	1,878,912	3,097,339	1	1	2	105	63	168	.82	.53	.65	86.18	33.53	54.24
1936	1,708,431	3,181,389	4,889,820	6		6	125	129	254	3.51		1.23	73.17	40.55	51.94
1937	2,414,320	3,628,014	6,042,334	5	1	6	166	172	338	2.07	.28	.99	68.76	47.41	55.94
1938	1,706,360	2,571,387	4,277,687	1		1	108	135	243	.59		.23	63.29	52.50	56.81
1939	2,125,900	3,213,225	5,339,125	3		3	186	190	376	1.41		.56	87.49	59.13	70.42
Trap rock:															
1935	2,551,950	1,683,273	4,235,223	5	1	6	150	71	221	1.96	.59	1.42	58.78	42.18	52.18
1936	3,100,658	1,689,935	4,790,593	7	1	8	195	86	281	2.26	.59	1.67	62.89	50.89	58.66
1937	2,914,941	1,559,517	4,474,458	2	2	4	274	61	335	.69	1.28	.89	94.00	39.11	74.87
1938	2,975,990	1,463,276	4,439,266	4	1	5	213	61	274	1.34	.68	1.13	71.57	41.69	61.72
1939	2,790,845	1,439,872	4,230,717	3	1	4	235	40	275	1.07	.69	.95	84.20	27.78	65.00
Total:															
1935	44,267,391	65,765,950	110,033,341	35	16	51	2,712	1,440	4,152	.79	.24	.46	61.26	21.90	37.73
1936	59,756,364	87,308,084	147,064,448	53	38	91	3,534	2,183	5,717	.89	.44	.62	59.14	25.00	38.87
1937	63,283,400	95,015,130	158,298,530	47	30	77	3,930	2,418	6,348	.74	.32	.49	62.10	25.45	40.10
1938	52,158,050	81,608,061	133,766,111	60	22	82	3,128	1,899	5,027	1.15	.27	.61	59.97	23.27	37.58
1939	55,834,784	88,011,799	143,846,583	31	17	48	3,375	1,829	5,204	.56	.19	.33	60.45	20.78	36.18

NONCOMMERCIAL QUARRIES

Since 1936 the Bureau of Mines has received reports from many plants that were operated by noncommercial agencies, such as States, counties, cities, and the Work Projects Administration. It is not believed that the reports received represented all operations of a noncommercial character, and it is impossible to state the extent of coverage represented by the reports for any of the 4 years covered by the yearly canvasses. All reports received, however, were tabulated, and the results for 1939 are shown in tables 43 to 46. Similar tables for previous years were published in earlier issues of this series of bulletins.

The reports on noncommercial quarries covered 413 plants operating in 33 States in 1939 and having a total working force of 13,092 men and a total of 17.1 million man-hours of labor performed, an average of 164 days or 1,309 hours per man. Each of these figures, except the number of men employed, represented a decrease from 1938. The reports for 1939 showed a weighted average workday of 8 hours. States having the largest number of employees were Kansas, Illinois, Iowa, and Missouri. Most of the quarries reported that the stone produced was used chiefly for surfacing roads.

It is not known whether or not accidents to the employees were completely covered by the reports. When no accidents were shown on the report form it was assumed that none occurred. The number of accidents reported included 4 fatalities and 821 nonfatal lost-time injuries. These figures showed a fatality rate of 0.23 and an injury rate of 47.91 per million man-hours of work done by all employees during the year. Included among the nonfatal injuries were 3 cases of permanent total disability, 12 of permanent partial disability, and 806 of temporary injury.

All of the plants for which reports were received were open quarries. Two fatalities were caused by explosives, 1 was due to falling objects, and 1 was caused by fall or slide of rock or overburden. Nonfatal injuries resulted mainly from handling materials; this cause comprised more than a third of the total number of injuries to employees inside the quarries. Other important causes of nonfatal injuries inside the quarries were flying objects and hand tools.

Of the total number of accidents, 762 were incident to quarry work, and 63 occurred in connection with work outside the quarries.

TABLE 43.—*Noncommercial quarries:*[1] *Number of active quarries, men employed, man-days, man-hours, and average days active, by States during the year ended Dec. 31, 1939*

State	Number of quarries	Men employed			Man-days of employment			Average days of employment per man			Man-hours of employment		
		At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total	At quarry	At outside works	Total
Georgia	18	538	118	656	109,132	21,093	130,225	203	179	199	872,396	170,006	1,042,402
Idaho	6	122	63	185	6,904	4,150	11,054	57	66	60	45,480	28,480	73,960
Illinois	54	1,262	341	1,603	187,499	47,310	234,809	149	139	146	1,502,342	369,648	1,871,990
Indiana	12	167	64	231	10,080	3,530	13,610	60	55	59	76,490	26,854	103,344
Iowa	46	1,067	358	1,425	155,448	51,065	206,513	146	143	145	1,169,774	386,282	1,556,056
Kansas	50	1,228	492	1,720	189,683	66,934	256,617	154	136	149	1,493,456	523,892	2,017,348
Kentucky	15	254	67	321	47,130	11,811	58,941	186	176	184	394,127	99,112	493,239
Michigan	7	144	40	184	18,035	4,946	22,981	125	124	125	147,268	41,389	188,657
Minnesota	4	638	103	741	184,892	24,994	209,886	290	243	283	1,479,139	199,954	1,679,093
Missouri	29	853	159	1,012	138,356	19,445	157,801	162	122	156	1,092,068	148,007	1,240,075
New York	31	614	196	810	84,919	23,777	108,696	138	121	134	650,073	188,339	838,412
North Carolina	3	90	36	126	20,115	8,121	28,236	224	226	224	183,319	76,171	259,490
Ohio	11	265	80	345	36,844	10,155	46,999	139	127	136	294,753	81,236	375,989
Oklahoma	10	163	25	188	19,642	2,383	22,025	121	95	117	157,133	19,067	176,200
Oregon	17	165	51	216	20,374	6,458	26,832	123	127	124	161,406	51,371	212,777
Tennessee	33	621	216	837	125,999	45,578	171,577	203	211	205	1,069,037	382,973	1,452,010
Virginia	16	478	160	638	90,226	31,273	121,499	189	195	190	826,949	286,682	1,113,631
Washington	11	38	33	71	5,460	5,103	10,563	144	155	149	42,782	40,487	83,269
Wisconsin	13	374	57	431	61,797	7,358	69,155	165	129	160	452,209	57,180	509,389
Other States [2]	27	1,137	215	1,352	198,625	37,521	236,146	175	175	175	1,552,093	296,538	1,848,631
Total	413	10,218	2,874	13,092	1,711,160	433,005	2,144,165	167	151	164	13,662,294	3,473,668	17,135,962

[1] Operated by States, counties, municipalities, and the Work Projects Administration. Includes quarries producing limestone, granite, sandstone, and trap rock. The table does not purport to cover all noncommercial quarries but only such as furnished accident and employment data to the Bureau of Mines.

[2] Includes Alabama, Arizona, Arkansas, California, Colorado, Florida, Maine, Massachusetts, Nebraska, Pennsylvania, South Dakota, Texas, Vermont, and West Virginia.

TABLE 44.—*Noncommercial quarries: Accidents by States and severity of injury, during the year ended Dec. 31, 1939*

State	Killed	Injured				Grand total
		Permanent total [1]	Permanent partial [2]	Temporary [3]	Total nonfatal	
Georgia				25	25	25
Idaho				5	5	5
Illinois			1	144	145	145
Indiana				3	3	3
Iowa			3	67	70	70
Kansas	1			25	25	26
Kentucky			1	22	23	23
Michigan				2	2	2
Minnesota				35	35	35
Missouri				29	29	29
New York				110	110	110
North Carolina				18	18	18
Ohio				23	23	23
Oklahoma				4	4	4
Oregon				12	12	12
Tennessee	1	3	4	137	144	145
Virginia			1	48	49	49
Washington				5	5	5
Wisconsin	1		1	64	65	66
Other States [4]	1		1	28	29	30
Total	4	3	12	806	821	825

[1] Permanent total disability: Loss of both legs or arms, 1 leg and 1 arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.
[2] Permanent partial disability: Loss of 1 foot, leg, hand, or eye, 1 or more fingers, 1 or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.
[3] Disability for more than remainder of day of accident.
[4] Includes, Alabama, Arizona, Arkansas, California, Colorado, Florida, Maine, Massachusetts, Nebraska, Pennsylvania, South Dakota, Texas, Vermont, and West Virginia.

TABLE 45.—*Noncommercial quarries: Fatalities and injuries and rates per million man-hours, by States, during the year ended Dec. 31, 1939*

State	Number killed			Number injured			Widows	Orphans	Rates per million man-hours					
									Killed			Injured		
	Open quarry	Outside works	Total	Open quarry	Outside works	Total			At quarry	At outside works	Total	At quarry	At outside works	Total
Georgia				22	3	25						25.22	17.65	23.98
Idaho				2	3	5						43.98	105.34	67.60
Illinois				142	3	145						94.52	8.12	77.46
Indiana				3		3						39.22		29.03
Iowa				69	1	70						58.99	2.59	44.99
Kansas	1		1	21	4	25	1	1	0.67		0.50	14.06	7.64	12.39
Kentucky				18	5	23						45.67	50.45	46.63
Michigan				2		2						13.58		10.60
Minnesota				34	1	35						22.99	5.00	20.84
Missouri				27	2	29						24.72	13.51	23.39
New York				109	1	110						167.67	5.31	131.20
North Carolina				15	3	18						81.82	39.39	69.37
Ohio				23		23						78.03		61.17
Oklahoma				4		4						25.46		22.70
Oregon				8	4	12						49.56	77.86	56.40
Tennessee	1		1	116	28	144			.94		.69	108.51	73.11	99.17
Virginia				49		49						59.25		44.00
Washington				5		5						116.87		60.05
Wisconsin	1		1	61	4	65			2.21		1.96	134.89	69.95	127.60
Other States [1]	1		1	28	1	29	1		.64		.54	18.04	3.37	15.69
Total	4		4	758	63	821	2	1	.29		.23	55.48	18.14	47.91

[1] Includes Alabama, Arizona, Arkansas, California, Colorado, Florida, Maine, Massachusetts, Nebraska, Pennsylvania, South Dakota .Texas, Vermont, and West Virginia.

TABLE 46.—*Noncommercial quarries: Accidents by causes and severity of injury, during the year ended Dec. 31, 1939*

Cause	Killed	Injured				Grand total
		Permanent total [1]	Permanent partial [2]	Temporary [3]	Total nonfatal	
Open quarry:						
1. Falls or slides of rock or overburden	1	2	3	57	62	63
2. Handling materials			3	308	311	311
3. Hand tools				88	88	88
4. Explosives	2			19	19	21
5. Haulage				23	23	23
6. Falls of persons				55	55	55
7. Falling objects (other than 1 and 2)	1			26	26	27
8. Flying objects		1	4	98	103	103
9. Electricity						
10. Drilling and channeling (by machine or hand)			1	17	18	18
11. Machinery			1	22	23	23
12. Stepping on nail				1	1	1
13. Boiler and air-tank explosions				1	1	1
14. Burns				4	4	4
15. Other causes				24	24	24
Total	4	3	12	743	758	762
At outside works:						
1. Haulage				7	7	7
2. Machinery				16	16	16
3. Hand tools				6	6	6
4. Stepping on nail						
5. Electricity						
6. Falls of persons				7	7	7
7. Falling objects (rocks, timbers, etc.)				6	6	6
8. Flying objects				8	8	8
9. Handling materials				12	12	12
10. Burns						
11. Other causes				1	1	1
Total				63	63	63
Grand total	4	3	12	806	821	825

[1] Permanent total disability: Loss of both legs or arms, 1 leg and 1 arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.
[2] Permanent partial disability: Loss of 1 foot, leg, hand, or eye, 1 or more fingers, 1 or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.
[3] Disability for more than remainder of day of accident.

FORM OF QUESTIONNAIRE

Several questionnaire forms were used by the Bureau of Mines in conducting its canvass of accidents and employment in the quarrying industry in 1939. One of the forms was designed specially for the cement industry, another for the lime industry, and a third for all other classes of quarries. The general form for all quarries except those whose production was used for making cement or lime is shown in figures 2 and 3.

G-631
(July 1939)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON

CONFIDENTIAL
FOR USE BY
DEPARTMENT OF
THE INTERIOR ONLY

QUARRIES AND MILLS: ACCIDENTS AND EMPLOYMENT IN 1939

Name of quarry .....
Location of quarry:
State ..... County .....
Nearest town .....
Location of mill:
State ..... County .....
Nearest town .....

Please reply to the following questions and return the schedule as promptly as possible in the enclosed envelope which requires no postage. (Ignore figures printed in small italics; they are code numbers for office use in the Bureau of Mines.)
A SEPARATE REPORT SHOULD BE PREPARED FOR EACH QUARRY that you controlled during the year.
If property was idle entire year, or abandoned or worked out during the year, please so state and return this schedule.
If property was sold or leased, or otherwise changed hands during the year, fill out this form for the period during which property was under your control, and state period during which quarry or mill was operated by you. (Period operated by you)

Name and address of company from which property was purchased or leased .....

Name and address of company to whom property was sold or leased .....

1. (*a*) Kind of rock quarried ..... (*b*) Is stone crushed, shaped, or used in regular form? .....
   (*c*) Please state chief purpose for which the stone is used .....
2. Employment:
   (*a*) In the following table please indicate the average number of men (include lessees and owners or operators when working, but exclude office men) employed at the property, number of days actually operated, and length of shift. Total man-hours equal man-shifts times length of shift. If actual figures are not available, estimate man-hours from pay roll.

		Average number of men working daily	Number of days plant was active	Number of shifts per 24 hours	Total man-shifts worked during year	Length of shift (hours)	Total man-hours worked during year
	At quarry:						
(*10*)	Open quarry						
(*20*)	Underground quarry						
(*30*)	At mill or other outside work:						
(*31*)	Crusher						
(*32*)	Sawing and finishing plant						
(*33*)	Granules and flour plant						
(*34*)	Cement mill						
(*35*)	Limekiln						
(*36*)	Miscellaneous (specify)						
	TOTAL						

   (*b*) Number of days quarry was active for production or development, during each month:
   (*1*) Jan. .....; (*3*) Mar. .....; (*5*) May .....; (*7*) July .....; (*9*) Sept. .....; (*11*) Nov. .....;
   (*2*) Feb. .....; (*4*) Apr. .....; (*6*) June .....; (*8*) Aug. .....; (*10*) Oct. .....; (*12*) Dec. .....
3. Total quantity of material, both stone and waste, removed from your quarry or mine during 1939:
   Stone ..... {short tons. / cubic feet. (Check which)} Waste or overburden ..... {short tons. / cubic feet. (Check which)}
4. Explosives used during the year (report in pounds or specify if other unit is used):

(*10*) Granular black powder (pounds)	(*20*) Pellet black powder (pounds)	(*30*) Permissible explosives (pounds)	(*40*) Dynamite and other high explosives (pounds)	(*50*) Liquid oxygen (LOX) (pounds)	(*60*) Liquid carbon dioxide (CARDOX) (pounds)

5. What was the date of the **last lost-time** injury at this quarry or plant prior to January 1, 1940? (A lost-time injury is one that disables an employee for more than the remainder of the day on which the accident occurred.) .....
6. If any **fatalities** occurred at the quarry or plant during 1939, give the dates on which the accidents occurred (not date of death): ....., ..., ...
7. If any new quarries were operated in your vicinity during the past year, give names and addresses of the owners or operators:
   .....
   .....
8. If you operated other quarries or mills for which you received no schedule, please advise and additional schedules will be sent to you.....

..... (Signature) ..... (Official position)

16—9044 **Please reply to the questions on the back of this schedule** [OVER]

FIGURE 2.—Questionnaire sent to plants in quarrying and related industries; face.

QUARRIES AND MILLS

ACCIDENTS DURING THE YEAR ENDED DECEMBER 31, 1939

IMPORTANT.—Include all accidents that caused disability for more than the remainder of the day on which the accident occurred whether compensable or noncompensable.

OPEN QUARRY

	Code No.	Killed	Permanent total disability [1]	Permanent partial disability [2]	Temporary injuries (disability more than remainder of day of accident)
Number killed or injured by—					
1. Falls or slides of rock or overburden	0100				
2. Handling materials:	0200				
(a) Handling rock at face	0201				
(b) Handling other materials	0202				
3. Hand tools	0300				
4. Explosives:	0400				
(a) Transportation	0401				
(b) Charging	0402				
(c) Drilling into old holes	0403				
(d) Striking in loose rock	0404				
(e) Thawing	0405				
(f) Caps, detonators, etc	0406				
(g) Unguarded shots	0407				
(h) Returned too soon	0408				
(i) Premature shots	0409				
(j) Delayed blasts	0410				
(k) Miscellaneous	0411				
5. Haulage:	0500				
(a) Hand and animal	0501				
(b) Mechanical	0502				
(c) Railway cars and locomotives	0503				
6. Falls of persons:	0600				
(a) Falling into quarry from surface, benches, or face	0601				
(b) Falling from hoists, derricks, ladders, etc	0602				
(c) Miscellaneous	0603				
Number killed or injured by—Contd.					
7. Falling objects (other than 1 and 2)	0700				
8. Flying objects:	0800				
(a) From sledging	0801				
(b) Others	0802				
9. Electricity:	0900				
(a) Direct contact with trolley wire	0901				
(b) Bar or tool striking trolley wire	0902				
(c) Contact with motor	0903				
(d) Others	0904				
10. Drilling and channeling (by machine or hand)	1000				
11. Machinery:	1100				
(a) Hoisting cables and attachments	1101				
(b) Guys, cranes, derricks, and attachments	1102				
(c) Pumps and hoisting engines	1103				
(d) Power shovels	1104				
(e) Other machinery	1105				
12. Stepping on nail	1200				
13. Boiler and air-tank explosions	1300				
14. Burns	1400				
15. Other causes	1500				
TOTAL OPEN QUARRY	1599				

UNDERGROUND QUARRY (MINE)

	Code No.	Killed	Permanent total disability [1]	Permanent partial disability [2]	Temporary injuries (disability more than remainder of day of accident)
Number killed or injured by—					
1. Fall of rock from roof or wall	0100				
2. Handling rock while loading at working face or chute	0200				
3. Hand tools	0300				
4. Explosives	0400				
5. Haulage	0500				
6. Falling down chute, winze, raise, or stope	0600				
7. Run of rock from chute or pocket	0700				
8. Drilling	0800				
9. Electricity	0900				
10. Machinery (other than locomotives or drills)	1000				
11. Mine fires	1100				
12. Suffocation from natural gases	1200				
13. Inrush of water	1300				
Number killed or injured by—Contd.					
14. Stepping on nail	1400				
15. Handling materials (other than rock)	1500				
16. Other causes	1600				
TOTAL UNDERGROUND					
SHAFT OR SLOPE					
17. Falling down shaft or slope	1700				
18. Objects falling down shaft or slope	1800				
19. Breaking of cables	1900				
20. Overwinding	2000				
21. Cage, skip, or bucket	2100				
22. Other causes	2200				
TOTAL SHAFT	2299				

MILL OR OTHER OUTSIDE WORK

(See item 2 on face of this schedule)

	Code No.	Killed	Permanent total disability [1]	Permanent partial disability [2]	Temporary injuries (disability more than remainder of day of accident)
Number killed or injured by—					
1. Haulage:	0100				
(a) Hand and animal	0101				
(b) Mechanical	0102				
(c) Railway cars and locomotives	0103				
2. Machinery:	0200				
(a) Hoisting cables and attachments	0201				
(b) Guys, cranes, derricks, and attachments	0202				
(c) Pumps and hoisting engines	0203				
(d) Crushers	0204				
(e) Other machinery	0205				
3. Hand tools	0300				
4. Stepping on nail	0400				
Number killed or injured by—Contd.					
5. Electricity:	0500				
(a) Direct contact with trolley wire	0501				
(b) Bar or tool striking trolley wire	0502				
(c) Contact with motor	0503				
(d) Others	0504				
6. Falls of persons	0600				
7. Falling objects (rocks, timbers, etc.)	0700				
8. Flying objects:	0800				
(a) From sledging	0801				
(b) From crushing	0802				
(c) Others	0803				
9. Handling materials:	0900				
(a) Handling rock by hand	0901				
(b) Handling other materials	0902				
10. Burns	1000				
11. Other causes	1100				
TOTAL OUTSIDE WORKS	1199				

Number of wives left widows ..... Number of children under 16 years of age left fatherless .....

Do the above figures include all injuries that disabled an employee for more than the remainder of the day of accident? .....

[1] PERMANENT TOTAL DISABILITY.—Loss of both legs or arms, 1 leg and 1 arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[2] PERMANENT PARTIAL DISABILITY.—Loss of 1 foot, leg, hand, or eye, 1 or more fingers, 1 or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

NOTE.—Injuries from flying particles should be charged to the tool or other agency that sets the particles in motion.

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FIGURE 3.—Questionnaire sent to plants in quarrying and related industries; reverse.

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