

UNITED STATES DEPARTMENT OF THE INTERIOR

HAROLD L. ICKES, *Secretary*

BUREAU OF MINES

JOHN W. FINCH, *Director*

Bulletin 422

METAL-MINE ACCIDENTS

IN THE

UNITED STATES

DURING THE CALENDAR YEAR 1936

BY

W. W. ADAMS and M. E. KOLHOS



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1939

CONTENTS

	Page
Introduction.....	1
Acknowledgments.....	3
Relation of statistics to calendar year.....	3
Scope of statistics.....	3
Classification of injuries.....	4
Classification of mines.....	4
Accident statistics, by States and causes.....	4
Classification of accidents, by kind of mine.....	19
Review by States.....	36
Accidents classified by mining methods.....	39
Placer mines.....	46
Mines operated without fatal accidents.....	48
Summary tables.....	50

METAL-MINE ACCIDENTS IN THE UNITED STATES DURING THE CALENDAR YEAR 1936 ¹

By W. W. ADAMS ² and M. E. KOLHOS ³

INTRODUCTION

This bulletin covers all mines in the United States that were operated in 1936 to produce metallic ores and all mines that were operated to produce nonmetallic minerals other than coal, stone, sand, gravel, or their products.

Reports from mine operators revealed a better safety record for fatal accidents in 1936 than in any other year except 1934 during the 26 years for which annual surveys of accidents in the mineral industries of the United States have been conducted by the Bureau of Mines. On the other hand, the record for nonfatal injuries, although better in 1936 than in any year prior to 1930, was not as good as it was from 1930 to 1935, inclusive.

California led all other States in the number of men employed at metal mines in 1936. Texas was the leading State in number of man-hours worked without a fatal accident. Minnesota led in injury rate; that is, it had the smallest number of nonfatal injuries in proportion to the number of man-hours worked at the mines. Table 1 shows the relative standing of the more important metal-mining (and non-metal-mining other than coal-mining) States in 1936 in number of employees, fatality rates, and nonfatal-injury rates.

Employment at the mines covered 100,932 men, an increase of 8,000 compared with 1936. The amount of employment during the 12 months averaged 250 days per man, an increase of 30 workdays per employee over the previous year. Measured in man-hours instead of man-days, the amount of employment per man averaged 2,005 hours, an increase of 258 hours per man. Combined records for all mines showed that the industry as a whole worked more than 25 million man-shifts, or more than 202 million man-hours—a weighted average of 8.03 hours per shift.

Accidents during the year resulted in 199 deaths and 14,650 nonfatal injuries among the men employed in and about the mines. This represents a fatality rate of 0.98 and an injury rate of 72.40 for each million man-hours during which employees were exposed to the hazards of their occupations. The corresponding rates for 1935 were 1.02 and 63.27. (See tables 2 to 5.) The fatal and nonfatal injuries are shown by causes of accidents in tables 6, 7, 9, and 10.

Reports for the year revealed two major disasters, that is, accidents in which 5 or more lives were lost. On August 13, 6 men lost their lives by suffocation in a mine at Mountain City, Elko County, Nev., and on October 6, 10 men were killed in a shaft accident in a mine at Mullan, Shoshone County, Idaho.

¹ Work on manuscript completed Mar. 23, 1939.

² Supervising statistician, Employment Statistics Section, Bureau of Mines.

³ Statistical assistant, Employment Statistics Section, Bureau of Mines.

The nonfatal injuries included 5 in which the injured employee was permanently and totally disabled, 290 in which the employee was permanently and partly disabled, and 14,355 in which the injury was only temporary and from which the employee recovered completely and was able to resume work with no loss of his earning power. (See tables 8 and 9.) The number of days of disability resulting from each of these injuries is not shown on the mining companies' reports to the Bureau of Mines. From the experience of some metal mines that have been enrolled in yearly safety contests conducted by the Bureau of Mines, the average temporary injury involves 39 days of disability and the average permanent partial disability 763 days. These averages are based on 676 temporary injuries that disabled the injured employees for 26,066 days and on 35 permanent partial injuries that disabled the employees for 26,720 days during 1934, 1935, and 1936. With this information as to the average number of days of disability per injury and the standard scale of time charges for deaths and permanent total disabilities, it is possible to estimate the approximate number of days of disability represented by the accidents that occurred in the metal-mining industry of the United States in 1936, as follows:

	<i>Days of disability</i>
199 deaths at 6,000 days each.....	1, 194, 000
5 permanent total disabilities at 6,000 days each.....	30, 000
290 permanent partial disabilities at 763 days each.....	221, 270
14,355 temporary injuries at 39 days each.....	559, 845
Total.....	2, 005, 115

Thus 2,005,115 days of disability from accidents at metal mines in the United States during 1936, when 202,358,725 man-hours of work were performed, represent an estimated accident-severity rate of 9.91 per thousand man-hours of employment. Corresponding rates for previous years, estimated upon the same average number of days of disability per injury, were 9.80 in 1933, 9.94 in 1934, and 9.93 in 1935. The accident-severity rate, which increased in 1934 over 1933, therefore has changed little during the past 3 years.

The accident-severity rates for the several classes of injuries reported to the Bureau of Mines during the past 4 years may be broken down into the following groups:

Accident-severity rates (days of disability per 1,000 man-hours of exposure)

	1933	1934	1935	1936
Fatalities.....	6.05	5.99	6.10	5.90
Permanent total disabilities.....	.32	.10	.26	.15
Permanent partial disabilities.....	1.03	1.26	1.16	1.09
Temporary disabilities.....	2.40	2.59	2.41	2.77
Total.....	9.80	9.94	9.93	9.91

As most accidents in mining occur underground, the chief causes of underground accidents indicate the principal hazards to which men employed in the mining industry are exposed. The relative importance of the principal causes of accidents does not vary greatly from year to year. In 1936 the four chief causes of fatal accidents were falls of rock or ore from the roof or wall, explosives, falling down winzes or slopes, and mine cars and locomotives. The main causes of

accidents resulting in nonfatal injuries to the workers were falls of rock or ore from the roof or wall, handling materials other than rock or ore, haulage, drilling, and handling rock or ore at the working face.

TABLE 1.—Relative standing of States having 1,000 or more men employed at mines in 1936, classified according to number of men employed and fatality and injury rates per million man-hours of labor performed

Relative standing	State	Number of men employed	Relative standing	State	Fatality rate ¹	Relative standing	State	Injury rate ¹
1	California.....	13,664	1	Texas.....	0.00	1	Minnesota.....	12.85
2	Montana.....	9,615	2	Oregon.....	.00	2	Alabama.....	23.84
3	Arizona.....	8,007	3	Florida.....	.00	3	Michigan.....	25.10
4	Minnesota.....	7,730	4	Tennessee.....	.49	4	Tennessee.....	25.29
5	Michigan.....	7,351	5	Michigan.....	.51	5	Florida.....	26.58
6	Colorado.....	6,261	6	South Dakota.....	.61	6	Missouri.....	34.09
7	Utah.....	5,023	7	Oklahoma.....	.66	7	Texas.....	45.21
8	Idaho.....	4,955	8	California.....	.67	8	South Dakota.....	48.34
9	Nevada.....	4,433	9	Missouri.....	.77	9	Alaska.....	48.84
10	Alaska.....	4,042	10	New Mexico.....	.78	10	Kansas.....	66.61
11	Alabama.....	3,755	11	Nevada.....	.80	11	Oregon.....	75.11
12	Oklahoma.....	2,587	12	Alabama.....	.88	12	Arizona.....	81.78
13	New Mexico.....	2,264	13	Montana.....	.90	13	Oklahoma.....	82.95
14	Missouri.....	2,142	14	Minnesota.....	.95	14	Utah.....	85.72
15	South Dakota.....	1,938	15	Arizona.....	1.04	15	Nevada.....	87.00
16	Tennessee.....	1,824	16	Utah.....	1.13	16	California.....	91.26
17	Texas.....	1,652	17	Alaska.....	1.41	17	New Mexico.....	99.96
18	New York.....	1,580	18	Kansas.....	1.68	18	New York.....	100.53
19	Kansas.....	1,302	19	New York.....	1.77	19	Colorado.....	105.66
20	Oregon.....	1,247	20	Colorado.....	2.20	20	Montana.....	107.46
21	Florida.....	1,109	21	Idaho.....	2.98	21	Idaho.....	143.14
	United States total.....	100,932		United States average.....	.98		United States average.....	72.40

¹ Number of deaths or injuries per million man-hours of exposure.

ACKNOWLEDGMENTS

The figures presented in this bulletin are based on reports furnished voluntarily by mining companies to the Bureau of Mines. The Bureau acknowledges and deeply appreciates the cooperation it has received from the operators.

RELATION OF STATISTICS TO CALENDAR YEAR

This and other statistical reports published regularly by the Bureau of Mines relate to calendar years. The data contained herein are intended to show the number of deaths and injuries resulting from accidents that occurred during the calendar year 1936. For accident-prevention studies it is believed that accidents should be charged to the year in which they occurred so that they may be examined in connection with the causes and conditions that produced them.

SCOPE OF STATISTICS

The tables in this paper are based on reports from 8,451 mines that were operated all or part of 1936. Data for mines in Alaska were furnished by the Territorial mine inspector; figures for all States were received directly from the operating companies, except those for Arizona and Idaho, which were received from the companies through the offices of the State mine officials. Reports for all States cover mines employing any men, whether the mines were

productive or nonproductive; many prospects also are included, although many others are omitted as it is obviously impossible to obtain complete reports for all prospects by mail.

CLASSIFICATION OF INJURIES

Statistics of accidents and employment at metal mines and all other mines except coal mines have been compiled by the Bureau of Mines since 1911. From 1911 to 1914, inclusive, the Bureau's classification of nonfatal injuries covered two groups: "Serious" injuries disabling a workman for more than 20 days and "slight" injuries causing disability not exceeding 20 days but longer than the remainder of the day of accident. From 1915 to 1929, inclusive, a "serious" injury, as the term was used in the Bureau's reports, signified a temporary injury disabling an employee more than 14 days. Beginning with 1930 all temporary injuries have been included in a single group, which comprises all temporary injuries causing disability for more than the remainder of the day on which the accident occurred.

CLASSIFICATION OF MINES

Tables on the following pages represent five divisions of the mining industry, as follows:

Copper mines.—This group comprises all mines reported in operation in which copper was the principal mineral produced.

Gold, silver, and miscellaneous metal mines.—This group comprises gold mines (both lode and placer), silver mines, lead-silver mines, gold-silver mines, lead and zinc mines other than those in the Mississippi Valley, and mines working ores of quicksilver, manganese, manganiferous iron, tungsten, vanadium, chromium, etc. Pyrite mines are included, as the cinder is used in some metallurgical works for its iron and copper content, and bauxite mines because bauxite is the main source of metallic aluminum.

Iron mines.—All iron mines are included in this group except those whose ores are valuable chiefly for their manganese content.

Lead and zinc mines (Mississippi Valley).—This group comprises the lead and zinc mines of the Mississippi Valley only, but it also includes fluor spar mines in Illinois and Kentucky.

Nonmetallic-mineral mines.—The nonmetallic-mineral mines include those that produce asbestos, asphaltum, barite, borax, emery, feldspar, flint, fluor spar (except in Illinois and Kentucky), garnet, graphite, gypsum, lithia, magnesite, mica, mineral paint, phosphate rock, quartz, salt, soapstone, sulphur, talc, and tripoli. Coal mines are not included, and the records do not cover properties that produce stone, clay, or sand and gravel.

ACCIDENT STATISTICS, BY STATES AND CAUSES

Tables 3 to 10, inclusive, show the number of men employed in the metal and nonmetallic-mineral mines of the United States during the calendar year 1936, the number of men injured or killed by accidents while at work, and the number and percentage of accidents due to the principal hazards to which miners are exposed.

TABLE 2.—All mines: Number of active mines, men employed, man-days, man-hours of employment, and number killed and injured, by kind of mine, during the year ended Dec. 31, 1936

Kind of mine	Number of operators	Number of mines	Men employed				Man-days of employment				Average hours of employment per man per day				Man-hours of employment			
			Underground		Surface		Underground		Surface		Underground		Surface		Underground		Surface	
			Open-cut	Total	Open-cut	Total	Open-cut	Total	Open-cut	Total	Open-cut	Total	Open-cut	Total	Open-cut	Total	Open-cut	Total
Copper.....	64	103	9,018	1,818	3,266	14,102	2,747,063	603,120	1,004,506	4,354,689	8.00	8.00	8.06	8.01	21,982,858	4,824,422	8,083,007	34,900,287
Iron.....	127	188	9,330	5,176	4,086	18,582	2,299,531	983,250	1,025,096	4,317,877	8.00	8.11	8.05	8.03	18,386,226	8,050,816	8,265,579	34,692,621
Lead and zinc (Mississippi Valley).....	162	212	5,827	154	715	6,696	1,334,154	30,230	108,113	1,532,497	8.02	9.19	8.00	8.04	10,701,268	277,862	1,344,313	12,323,443
Gold, silver, and miscellaneous.....	(1)	7,433	83,758	2,964	14,440	51,162	8,660,968	492,879	3,162,347	12,316,194	8.03	7.99	8.03	8.03	69,558,952	3,936,092	25,391,463	98,886,507
Gold, silver: Lode.....	(1)	4,386	30,537	971	6,066	37,574	7,902,746	170,411	1,668,869	9,742,026	8.04	7.89	8.04	8.04	63,542,832	1,344,575	13,421,209	78,308,616
Gold: Placer.....	(1)	2,846	972	1,423	7,998	10,393	174,739	229,212	1,403,643	1,807,594	7.88	8.04	8.02	8.01	1,376,531	1,843,140	11,252,920	14,472,591
Miscellaneous.....	193	201	2,249	570	376	3,195	583,483	93,256	89,835	766,574	7.95	8.02	7.99	7.96	4,633,889	748,377	717,334	6,105,300
Nonmetal.....	475	515	3,394	3,963	3,023	10,380	830,969	909,206	948,473	2,688,648	8.00	8.34	7.72	8.02	6,645,437	7,587,048	7,323,382	21,555,867
Total, 1936.....	(1)	8,451	61,327	14,075	25,530	100,922	15,872,685	3,028,685	6,308,535	25,203,005	8.02	8.15	7.99	8.03	127,374,741	24,676,240	50,407,744	202,338,725
Total, 1935.....	(1)	10,819	54,405	11,888	29,021	92,314	12,398,704	2,486,865	5,466,803	20,352,372	7.92	8.13	7.84	7.93	98,212,096	20,220,525	42,870,050	161,302,671

TABLE 2.—All mines: Number of active mines, men employed, man-days, man-hours of employment, and number killed and injured, by kind of mine, during the year ended Dec. 31, 1936—Continued

Kind of mine	Average days active			Average hours per man per year			Number killed			Number injured			Orphans			Widows			Rates per million man-hours						
	Underground	Surface	Total	Underground	Surface	Total	Underground	Surface	Total	Underground	Surface	Total	Underground	Surface	Total	Underground	Surface	Total	Killed			Injured			
																			Open-cut	Surface	Total	Open-cut	Surface	Total	
Copper.....	305	332	308	2,438	2,654	2,478	2,475	30	5	3	38	2,488	89	242	2,819	15	21	1.09	1.04	0.37	113	18	18.45	29.90	80.77
Iron.....	246	192	251	1,971	1,555	2,020	1,866	24	3	2	29	713	97	58	868	25	57	.84	.87	.24	38	78	12.05	70.26	23.02
Lead and zinc (Mississippi Valley).....	229	196	235	1,836	1,804	1,880	1,840	15	1	1	17	652	8	32	692	9	26	1.38	3.60	.74	60	93	28.79	23.80	56.15
Gold, silver, and miscellaneous.....	257	166	219	2,061	1,828	1,758	1,933	98	4	9	111	7,812	111	1,304	9,227	51	63	1.12	1.02	.35	112	31	28.20	51.36	93.31
Gold, silver, Lode.....	259	176	275	2,081	1,885	2,213	2,084	86	1	4	91	7,252	57	876	8,185	43	50	1.16	1.14	.30	114	13	42.39	65.27	104.52
Gold: Placer.....	180	161	175	1,416	1,295	1,407	1,393	4	3	4	11	1,077	40	360	507	2	2	2.91	1.63	.36	76	73	21.70	31.69	33.03
Miscellaneous.....	259	164	239	2,063	1,313	1,908	1,911	8	1	9	9	453	14	68	535	6	11	1.72	1.39	1.39	97	64	18.71	94.80	87.63
Nonmetal.....	245	229	314	1,958	1,914	2,423	2,077	3	1	4	380	429	235	1,044	2	2	.45	.13	-----	57	18	56.54	32.09	48.43	
Total, 1936.....	259	215	247	2,075	1,753	1,974	2,005	170	14	15	199	12,045	734	1,871	14,650	102	169	1.34	.57	.30	94	64	29.75	37.12	72.40
Total, 1935.....	228	209	210	1,805	1,701	1,648	1,747	132	10	22	164	8,117	529	1,560	10,206	78	156	1.02	.49	.51	82	65	26.16	36.39	63.27

¹ Not available.

TABLE 3.—All mines: Number of active mines, men employed, man-days of employment, and man-hours of employment, by States, during the year ended Dec. 31, 1936

State	Num-ber of opera-tors	Men employed				Man-days of employment				Man-hours of employment			
		Num-ber of mines	Under-ground	Open-cut	Surface	Total	Under-ground	Open-cut	Surface	Total	Under-ground	Open-cut	Surface
Alabama.....	48	2,576	587	592	3,755	588,324	121,279	130,512	840,115	4,729,441	1,056,342	1,051,573	6,837,356
Alaska.....	(1)	532	2,465	582	4,042	296,857	93,060	523,541	885,458	2,134,696	4,744,480	7,083,668	
Arizona.....	1,182	5,189	1,953	8,007	13,653	1,428,692	338,968	328,231	2,040,896	11,407,730	2,941,201	16,300,630	
Arkansas.....	21	22	316	54	594	78,807	33,489	13,211	105,607	1,057,910	105,689	1,057,910	
California.....	1,861	8,426	4,258	13,684	24,757	1,891,724	1,114,720	1,176,724	3,767,328	19,639,528	8,887,544	30,046,352	
Colorado.....	687	4,786	256	1,219	6,261	1,165,574	54,921	266,048	9,294,416	442,308	2,144,204	11,820,742	
Connecticut.....	7	44	1	13	58	8,546	39	118,134	271,933	75,776	21,668	97,752	
Florida.....	20	62	699	410	1,109	169,224	159,224	118,324	277,348	1,386,740	1,021,190	2,407,930	
Georgia.....	62	157	184	865	38,608	88,468	121,181	19,468	181,520	182,810	182,810	674,251	
Illinois.....	635	3,480	126	12,179	875,029	288,742	173,660	1,703,452	6,981,367	1,055,523	2,302,616	9,339,523	
Indiana.....	26	300	86	1,340	4,955	79,387	23,253	36,577	139,217	199,050	292,616	1,140,308	
Iowa.....	8	96	21	3	120	20,830	3,293	790	24,613	24,659	6,320	31,039	
Kansas.....	34	87	1,162	30	1,302	295,992	5,282	28,953	298,207	42,615	216,146	2,387,152	
Kentucky.....	50	57	547	110	847	112,183	17,800	35,146	168,131	972,271	316,066	1,457,189	
Louisiana.....	5	5	147	375	33,633	713,677	132,941	174,414	1,021,052	168,852	1,017,386	1,271,799	
Maine.....	36	37	116	119	222	33,306	21,964	22,270	54,536	173,290	157,850	180,747	
Michigan.....	32	54	4,663	2,406	7,351	1,294,909	42,833	634,436	1,972,178	10,346,548	5,085,664	15,776,702	
Minnesota.....	28	59	2,155	7,730	5,120,006	808,805	382,621	1,703,452	3,086,563	6,475,065	3,090,958	13,632,076	
Missouri.....	87	96	1,602	487	382,636	95,811	11,660	480,107	3,049,740	768,972	93,698	3,901,426	
Montana.....	832	874	7,363	102	9,615	2,000,312	14,515	486,743	2,501,570	16,013,744	3,949,564	20,081,558	
Nevada.....	698	718	3,156	540	737	713,677	132,941	174,414	1,021,052	6,174,788	1,065,612	8,747,530	
New Hampshire.....	10	15	39	96	135	12,685	18,654	28,100	31,339	101,553	207,703	259,385	
New Jersey.....	6	7	627	22	761	144,834	6,159	177,083	1,157,092	48,572	367,394	1,418,267	
New Mexico.....	103	109	832	40	392	532,235	5,684	122,332	600,251	4,119,111	48,546	5,122,051	
New York.....	25	30	2,201	76	2,569	314,294	20,037	85,980	420,311	2,462,863	733,470	3,382,000	
North Carolina.....	49	52	230	85	674	49,303	77,751	138,766	415,966	107,389	1,148,811	1,353,208	
Ohio.....	5	5	80	29	111	8,503	7,300	316	16,119	62,980	207,072	454,794	
Oklahoma.....	75	253	356	158	2,567	454,612	86,086	26,383	3,650,946	687,076	882,948	4,544,794	
Oregon.....	21	285	557	199	491	1,247	24,144	109,574	244,746	185,722	357,882	1,957,159	
Pennsylvania.....	8	7	76	149	48	273	41,947	14,123	77,689	158,548	17,922	232,470	
South Carolina.....	5	5	66	10	23	99	19,140	6,454	28,344	158,948	6,000	232,470	
South Dakota.....	47	50	1,161	134	1,958	355,735	34,201	228,027	617,963	273,612	1,823,210	4,072,536	
Tennessee.....	27	33	891	442	1,824	220,085	116,885	104,018	475,988	1,079,148	1,394,046	3,937,549	
Texas.....	25	28	351	153	1,148	1,048,832	37,492	406,557	548,961	813,739	239,542	2,894,549	
Utah.....	203	232	3,284	683	5,023	847,900	337,289	199,591	1,384,780	6,773,120	2,639,640	11,091,691	
Vermont.....	6	18	122	5	145	6,060	41	1,467	28,548	48,480	11,786	1,707,593	
Virginia.....	24	26	385	252	891	98,385	48,319	66,234	212,938	777,639	405,958	1,177,592	
Washington.....	155	158	419	120	803	129,833	32,278	146,925	679,707	234,352	239,180	1,173,267	
Wisconsin.....	10	13	601	205	803	176,159	46,326	176,159	1,038,651	370,616	1,409,267	1,409,267	
Wyoming.....	33	34	214	132	383	41,462	5,993	15,985	63,400	48,037	127,988	1,906,627	
Other States ¹	13	13	72	72	13,147	13,147	13,147	13,147	21,000	106,604	127,988	127,988	
Total, 1936.....	(1)	8,451	61,327	14,075	25,530	100,952	3,028,685	6,308,535	25,208,905	127,274,741	24,676,240	50,407,744	202,368,725
Total, 1935.....	(1)	10,819	54,405	11,888	25,021	92,314	12,398,704	5,466,893	20,352,372	98,212,066	20,220,525	42,870,060	161,302,671

¹Includes Indiana, Maryland, Massachusetts, Nebraska, and West Virginia.

¹Not available.

TABLE 4.—All mines: Average length of workday (hours), average days active, average hours per man per year, by States, during the year ended Dec. 31, 1936

State	Average length of workday (hours)				Average days active				Average hours per man per year			
	Underground	Open-cut	Surface	Total	Underground	Open-cut	Surface	Total	Underground	Open-cut	Surface	Total
Alabama.....	8.04	8.71	8.06	8.14	228	207	220	224	1,836	1,800	1,776	1,821
Alaska.....	8.00	8.00	8.00	8.00	268	160	213	219	2,145	1,279	1,706	1,753
Arizona.....	7.98	8.00	7.99	7.99	275	282	189	255	2,198	2,256	1,506	2,036
Arkansas.....	8.03	8.00	8.00	8.02	243	150	245	208	1,953	1,196	1,957	1,668
California.....	7.99	7.92	7.97	7.98	292	196	262	275	2,331	1,550	2,087	2,199
Colorado.....	7.99	8.05	8.04	8.00	241	215	219	236	1,929	1,727	1,759	1,888
Connecticut.....	8.87	7.90	9.00	8.89	194	39	185	190	1,722	308	1,667	1,685
Florida.....	8.71	8.71	8.65	8.68	228	288	250	228	1,984	2,491	2,171	2,171
Georgia.....	8.03	8.57	9.19	8.46	172	135	108	141	1,384	1,156	994	1,193
Idaho.....	7.98	8.66	7.97	7.98	251	97	214	237	2,006	837	1,707	1,895
Illinois.....	8.17	8.56	8.00	8.19	265	274	281	270	2,162	2,315	2,251	2,210
Iowa.....	7.86	7.49	8.00	7.81	217	157	263	208	1,704	1,174	2,107	1,622
Kansas.....	8.00	8.07	8.03	8.01	229	176	245	229	1,832	1,421	1,965	1,833
Kentucky.....	8.67	9.49	8.29	8.67	205	162	201	199	1,777	1,535	1,664	1,720
Louisiana.....	7.56	7.97	7.97	7.88	229	340	309	319	1,731	2,713	2,436	2,436
Maine.....	8.00	8.12	8.12	8.12	102	189	187	187	816	1,537	1,519	1,519
Michigan.....	7.99	8.04	8.02	8.00	278	152	264	268	2,219	1,222	2,114	2,146
Minnesota.....	7.98	8.01	8.00	8.00	238	197	262	220	1,896	1,575	2,092	1,762
Missouri.....	7.95	8.01	8.03	7.96	239	197	230	229	1,898	1,575	1,766	1,821
Montana.....	8.01	8.01	8.11	8.03	272	142	226	260	2,175	1,140	1,837	2,089
Nevada.....	8.65	8.00	8.65	8.57	226	246	237	230	1,957	1,970	2,048	1,973
New Hampshire.....	8.00	8.46	8.46	8.28	325	194	232	232	2,603	1,644	1,921	1,921
New Jersey.....	7.99	8.68	7.96	8.01	231	280	233	233	1,845	2,431	1,854	1,864
New Mexico.....	7.74	8.01	7.83	7.76	291	142	312	292	2,248	1,139	2,442	2,262
New York.....	7.84	9.77	8.41	8.05	262	264	294	268	2,051	2,575	2,478	2,156
North Carolina.....	8.42	8.06	8.45	8.22	214	217	150	207	1,805	1,745	1,263	1,704
Ohio.....	7.37	9.32	8.00	8.25	106	252	158	145	784	2,345	1,264	1,200
Oklahoma.....	8.03	7.82	7.85	8.01	221	242	167	221	1,778	1,932	1,311	1,770
Oregon.....	7.97	7.82	8.07	8.00	199	121	223	196	1,588	948	1,800	1,569
Pennsylvania.....	8.00	8.05	8.00	8.03	284	282	294	284	2,271	2,266	2,354	2,283
South Carolina.....	8.28	8.00	8.98	8.44	290	75	281	266	2,402	600	2,518	2,247
South Dakota.....	8.00	8.00	8.00	8.00	306	255	344	316	2,451	2,042	2,753	2,525
Tennessee.....	8.18	9.31	8.53	8.56	247	262	285	261	2,019	2,442	2,432	2,233
Texas.....	7.76	7.99	6.95	7.17	299	245	354	332	2,318	1,958	2,460	2,384
Utah.....	7.99	7.83	8.01	7.95	258	320	292	276	2,062	2,500	2,342	2,016
Vermont.....	8.00	8.88	8.00	8.64	337	172	293	197	2,693	1,529	2,347	1,702
Virginia.....	7.90	8.40	7.91	8.02	256	192	261	239	2,019	1,611	2,064	1,916
Washington.....	7.96	8.01	8.03	7.99	204	244	137	190	1,622	1,953	1,103	1,516
Wisconsin.....	8.00	8.00	8.00	8.00	216	229	219	219	1,728	1,835	1,755	1,755
Wyoming.....	7.95	8.06	8.01	7.97	194	161	121	166	1,540	1,298	970	1,320
Other States ¹	8.00	8.11	8.09	8.09	219	219	219	219	1,750	1,777	1,772	1,772
Total, 1936.....	8.02	8.15	7.99	8.03	259	215	247	250	2,075	1,753	1,977	2,005
Total, 1935.....	7.92	7.84	8.13	7.93	228	209	210	210	1,805	1,701	1,648	1,747

¹ Includes Indiana, Maryland, Massachusetts, Nebraska, and West Virginia.

TABLE 5.—All mines: Fatalities and injuries and rates per million man-hours, by States, during the year ended Dec. 31, 1936

State	Number killed				Number injured (time lost, 1 day or more)				Widows	Orphans	Rates per million man-hours							
											Killed				Injured			
	Underground	Open-cut	Surface	Total	Underground	Open-cut	Surface	Total			Underground	Open-cut	Surface	Total	Underground	Open-cut	Surface	Total
Alabama	6	1	6	131	18	14	163	6	8	1.27	0.88	27.70	17.04	13.31	23.84			
Alaska	9	1	10	212	134	346	(1)	4	2.22	1.34	1.41	99.31	31.87	48.84	48.84			
Arizona	14	2	17	1,148	22	163	1,333	14	22	1.22	1.02	100.63	11.27	55.42	81.78			
Arkansas	1	30	3	30	3	33	33	1	1	1.62	1.01	48.61	11.20	33.31	33.31			
California	15	2	3	2,194	88	460	2,742	11	7	1.76	1.32	111.71	57.93	51.76	91.26			
Colorado	25	1	26	1,059	14	176	1,249	6	10	2.71	1.47	219.16	31.66	82.08	105.66			
Connecticut				15			15					197.95			153.45			
Florida				37	27	64	64					26.68	26.44	26.68	26.68			
Georgia	1	1	1	7	6	3	16	1	2	5.51	1.48	22.59	33.05	16.41	23.73			
Idaho	24	1	3	1,229	1	114	1,344	12	17	3.44	1.30	176.04	9.48	49.51	143.14			
Illinois	4	1	5	28	8	36	36		6	17	5.02	4.38	43.16	40.19	31.57			
Iowa				7			7					42.78			35.97			
Kansas	3	1	4	155	1	3	159	2	8	1.41	4.63	1.68	72.82	23.47	13.88	66.61		
Kentucky				106	38	28	172					109.02	225.05	88.59	118.04			
Louisiana				14		21	35					55.03		20.64	27.82			
Maine				3			3					16.83			16.60			
Michigan	8		8	350	5	41	396	7	11	77	51	33.83	14.51	8.06	25.10			
Minnesota	9	3	13	89	69	17	175	9	22	2.20	1.33	95	21.78	10.66	5.55	12.85		
Missouri	3		3	119	14		133	3	14	99	77	39.13	18.25		34.09			
Montana	17	1	18	1,947	3	208	2,158	5	5	1.06	25	121.57	25.80	52.66	107.46			
Nevada	6	1	7	636	41	84	761	2		97	94	80	103.00	38.55	55.66	87.00		
New Hampshire				3	1		4					29.55	6.34		15.42			
New Jersey				42	1		43					36.30	18.70		30.32			
New Mexico	4		4	449	2	61	512	3	2	97	78	109.00	43.91	63.71	99.96			
New York	5	1	6	322	3	15	340	5	17	2.03	1.38	177	130.74	15.33	20.73	100.53		
North Carolina				46	43	3	92					110.83	68.65	27.94	80.08			
Ohio																		
Oklahoma	3		3	264	102	11	377	2		82	66	72.33	148.33	53.12	82.95			
Oregon				111	11	25	147					125.50	58.29	28.28	75.11			
Pennsylvania				9	5	2	16					52.15	14.81	17.70	25.68			
South Carolina				12	1	1	14					75.69	166.67	17.26	62.93			
South Dakota	3		3	206	9	24	239	2	2	1.05	61	72.39	32.89	13.15	48.34			
Tennessee	2		2	51	40	12	103	2	4	1.11	49	28.34	37.07	10.05	25.29			
Texas				66	10	102	178					81.11	33.38	36.12	45.21			
Utah	9	2	13	808	66	70	944	8	18	1.33	1.76	119.31	25.00	43.76	85.72			
Vermont				9	31	3	43					185.64	166.16	255.62	174.24			
Virginia				60	20	23	103					77.18	49.27	43.88	60.32			
Washington		1	1	48	14	18	80	1			3.86	85	70.62	59.74	69.45	68.19		
Wisconsin				34		2	36					32.73		5.40	25.55			
Wyoming				29	1	6	36					87.98	20.82	46.88	71.20			
Other States ²					3		3						28.14		23.51			
Total, 1936	170	14	15	199	12,045	734	1,871	14,650	(1)	(1)	1.34	.57	.30	98	64.64	29.75	37.12	72.40
Total, 1935	132	10	22	164	8,117	529	1,560	10,206	78	156	1.34	.49	.51	1.02	82.65	26.16	36.39	63.27

¹ Not available.² Includes Indiana, Maryland, Massachusetts, Nebraska, and West Virginia.

TABLE 6.—All mines: Fatalities, by causes and States, during the year ended Dec. 31, 1936

State	Underground													Shaft											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total, underground	Falling down shaft	Objects falling down shaft	Breaking of cables	Overwinding	Skip, cage, or bucket	Other causes	Total, shaft	
Alabama.....	6																								
Alaska.....	2																								
Arizona.....	2					3																			
Arkansas.....	2					3																			
California.....	5																								
Colorado.....	8					5																			
Georgia.....	5																								
Idaho.....	9																								
Illinois.....	2					2																			
Kansas.....	2																								
Michigan.....	3						1			1															
Minnesota.....	3																								
Missouri.....	1																								
Montana.....	6																								
Nebraska.....	1																								
Nevada.....	2																								
New Mexico.....	4																								
New York.....	2																								
Oklahoma.....	2																								
South Dakota.....	1																								
Tennessee.....	1																								
Texas.....	4																								
Utah.....	4																								
Washington.....	4																								
Total, 1936.....	60			23	12	13	1	1	7	1	1	7	2	1	4	10	131	13	4	10	20	21	22	39	
Total, 1935.....	48			23	9	12	2	2	7	2	1	2	2	1	1	2	110	9	4	10	12	12	1	22	

State	Open-cut										Surface										Grand total				
	Falls or slides of rock or ore	Explosives	Haulage	Power shovels	Falls of persons	Falls of derricks, booms, etc.	Run or fall of ore bins	Machinery	Electricity	Hand tools	Handling mate-rials	Other causes	Total, open-cut	Mine cars, mine locomotives, or aerial trams	Railway cars and locomotives	Run or fall of ore bins	Falls of persons	Stepping on nail	Hand tools	Electricity		Machinery	Handling mate-rials	Other causes	Total, surface
Alabama																									
Alaska																									
Arizona	1		1										1												1
Arkansas																									
California	2												2												3
Colorado														1											1
Georgia	1																								
I Idaho	1												1												1
Illinois																									
Kansas																									
Michigan																									1
Minnesota					1								3												1
Missouri																									1
Montana																									
Nevada													1												1
New Mexico																									
New York																									1
Oklahoma																									
South Dakota																									
Tennessee																									
Texas																									
Utah																									2
Washington																									1
Total, 1936	5	1	6	1	1			2	1	9	11	12	14	1	1	2	3	3	3	2	2	2	6	9	15
Total, 1935	4		2					1				1	10			2				2	1	2	6	9	22

Tennessee.....	3	5	4	2	4	4	1	5	1	1	1	2	2	40	2	1	2	2	2	2	
Texas.....	3	19	3	1	4	3	5	5	3	3	3	4	3	4	16	2	1	1	1	2	
Utah.....	164	33	71	4	136	34	12	75	34	12	14	4	11	793	2	2	7	3	7	15	
Vermont.....	3	3	2	2	2	2	2	11	2	2	2	2	2	9	1	1	1	1	1	1	
Virginia.....	6	7	2	1	5	2	12	4	2	12	1	1	1	59	5	5	2	2	2	3	
Washington.....	7	2	8	2	4	4	4	2	1	4	1	4	1	35	7	1	2	2	2	3	
Wisconsin.....	5	10	2	2	6	1	4	2	4	4	1	4	2	33	4	1	1	1	1	1	
Wyoming.....	4	3	3	1	1	2	9	2	2	2	2	2	2	29	4	2	4	4	4	1	
Other States ¹	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total, 1936.....	2,506	1,041	830	91	1,448	507	475	1,073	33	269	8	21	196	1,756	1,525	56	3	1	77	104	262
Total, 1935.....	1,572	803	635	99	897	535	323	768	34	181	12	19	170	1,027	870	29	7	1	80	30	168

¹ Includes Indiana, Maryland, Massachusetts, Nebraska, and West Virginia.

TABLE 7.—All mines: Injuries, by causes and States, during the year ended Dec. 31, 1936—Continued

State	Open-cut										Surface										Grand total					
	Falls or slides of rock or ore	Explosives	Haulage	Power shovels	Falls of persons	Falls of derricks, booms, etc.	Run or fall of ore in bins	Machinery	Electricity	Hand tools	Handling materials	Other causes	Total, open-cut	Mine cars, mine locomotives, or aerial trams	Railway cars and locomotives	Run or fall of ore in bins	Falls of persons	Stepping on nail	Hand tools	Electricity		Machinery	Handling materials	Other causes	Total, surface	
Alabama.....	1	2	3	4	5	6	7	8	9	10	11	12	18	1	2	3	4	5	6	7	8	9	10	14		
Alaska.....			1		2	1				6	8								1	1	3	5	1	1	159	
Arizona.....	2	2	2	2	1	4				3	2	4	22	8	5	19	7	7	12	3	15	36	9	28	172	
Arkansas.....											1		3		2									8	134	
California.....	13	4	1	1	14	1	2	6	6	15	13	19	88	8	1	4	62	14	44	9	90	121	108	460		
Colorado.....					1			1	1	2	10	14	14	12	1	3	19	10	13	4	13	63	38	176		
Connecticut.....					2	13		2	1	1	9	9	37		1	7			3		1	4			2,742	
Florida.....					1	6		3	1	2	1		6		1										64	
Georgia.....					1	1		1		1		4	8		6	4		4	18	3	15	27	3	3	16	
Illinois.....					1	1		1		1			1		3										344	
Iowa.....																									36	
Kansas.....	6	1	6	1	2			3		4	10	5	38		1										7	
Kentucky.....																									159	
Louisiana.....																									28	
Maine.....																									172	
Michigan.....	1	5			2			1		1	1	1	3		1	2	10	4	4	1	4	9	8	41	396	
Minnesota.....	1	8	5	9	1		1	6		5	19	14	69		1	2	4	4	4	1	1	3	4	17	175	
Missouri.....	4	1	1							1	5	1	14		3	7	25	4	14	1	12	96	37	208		
Montana.....										1	5	10	7	41	12	2	14	4	11	2	11	21	21	84	2,158	
Nevada.....	7	2	1	1	5		2	1		5	10	7	41		2	2									761	
New Hampshire.....																									43	
New Jersey.....																									4	
New Mexico.....																									512	
New York.....	1	1			1			1					2		1	2	2	4	4	1	8	6	30	61	340	
North Carolina.....	3	6	6		6			4		6	12	6	43		1			1						92		
Ohio.....	51	3	2	6	2	1		8		9	17	3	102		3	1	1	2	1	2	2	1	1	11	377	
Oregon.....					2					2	5	11	5		6	6	3	5	5	1	6	4	1	1	25	147
Pennsylvania.....	1	1		1							2		5		1			1							2	16
South Carolina.....																									1	14
South Dakota.....					1						8		9		1		4	2	3		2	2	4	8	239	

Tennessee	4	1	2	4	2	2	23	40	2	1	12	1	1	6	27	102	12	103	
Texas	17	3	7	7	2	6	3	10	2	1	15	1	10	26	10	178	12	178	
Utah	6	1	2	2	1	10	14	66	5	3	15	1	10	18	70	3	944	944	
Vermont	1	1	2	2	1	4	12	21	1	1	4	1	2	2	7	23	103	103	
Virginia	1	1	2	2	1	11	5	20	1	1	5	1	3	6	3	18	80	80	
Washington	1	1	4	4	1	7	1	14	1	1	1	1	3	1	3	18	36	36	
Wisconsin	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	36	36
Wyoming	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	2	36	36
Other States ¹	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	6	3	3
Total, 1936	120	16	41	27	83	109	139	734	85	90	257	27	260	502	446	1,871	14,650	14,650	14,650
Total 1935	51	8	45	25	76	117	83	529	66	22	247	17	205	358	434	1,560	10,206	10,206	10,206

¹ Includes Indiana, Maryland, Massachusetts, Nebraska, and West Virginia.

16 METAL-MINE ACCIDENTS IN THE UNITED STATES: 1936

TABLE 8.—All mines: Accidents, by States and severity of injury, during the year ended Dec. 31, 1936

State	Killed	Nonfatal			Total nonfatal	Grand total
		Perma- nent total ¹	Perma- nent partial ²	Tempo- rary ³		
Alabama.....	6		13	150	163	169
Alaska.....	10		3	343	346	356
Arizona.....	17	2	43	1,288	1,333	1,350
Arkansas.....	1			33	33	34
California.....	20		31	2,711	2,742	2,762
Colorado.....	26	1	26	1,222	1,249	1,275
Connecticut.....			1	14	15	15
Florida.....				64	64	64
Georgia.....	1		2	14	16	17
Idaho.....	28		26	1,318	1,344	1,372
Illinois.....	5		2	34	36	41
Iowa.....				7	7	7
Kansas.....	4		8	151	159	163
Kentucky.....			2	170	172	172
Louisiana.....				35	35	35
Maine.....				3	3	3
Michigan.....	8		15	381	396	404
Minnesota.....	13		11	164	175	188
Missouri.....	3		7	126	133	136
Montana.....	18	1	7	2,150	2,158	2,176
Nevada.....	7		8	753	761	763
New Hampshire.....				4	4	4
New Jersey.....			6	37	43	43
New Mexico.....	4		4	508	512	516
New York.....	6		15	325	340	346
North Carolina.....			3	89	92	92
Oklahoma.....	3		10	367	377	380
Oregon.....	1			146	147	147
Pennsylvania.....			2	14	16	16
South Carolina.....			1	13	14	14
South Dakota.....	3	1	2	236	239	242
Tennessee.....	2		6	97	103	105
Texas.....			4	174	178	178
Utah.....	13		18	926	944	957
Vermont.....			1	42	43	43
Virginia.....	4		4	99	103	103
Washington.....	1		5	75	80	81
Wisconsin.....			2	34	36	36
Wyoming.....			1	35	36	36
Other States ⁴				3	3	3
Total, 1936.....	199	5	290	14,355	14,650	14,849
Total, 1935.....	164	7	246	9,953	10,206	10,370

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 workmen from doing any work of a gainful occupation.

² Permanent partial disability: Loss of 1 foot, leg, arm, hand, 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 the remainder of day of accident.

⁴ Includes Indiana, Maryland, Massachusetts, Nebraska, and West Virginia.

TABLE 9.—All mines: Accidents, by causes and severity of injury, during the year ended Dec. 31, 1936

Cause of accident	Killed	Nonfatal				Grand total
		Perma- nent total ¹	Perma- nent partial ²	Tempo- rary ³	Total non- fatal	
Underground:						
1. Fall of rock or ore from roof or wall	60	2	34	2,470	2,506	2,566
2. Rock or ore while loading at working face			23	1,018	1,041	1,041
3. Hand tools			15	815	830	830
4. Explosives	23		12	79	91	114
5. Haulage	12	1	48	1,399	1,448	1,460
6. Falling down chute, winze, raise, or stope	13	1	11	495	507	520
7. Run of ore from chute or pocket	1		7	468	475	476
8. Drilling			18	1,055	1,073	1,073
9. Electricity			1	32	33	33
10. Machinery	1		15	254	269	270
11. Mine fires				8	8	8
12. Suffocation from natural gases	7			21	21	28
13. Inrush of water				4	4	4
14. Stepping on nail				196	196	196
15. Handling materials (other than rock or ore)	4		24	1,501	1,525	1,529
16. Other causes	10		18	1,738	1,756	1,766
Total, underground	131	4	226	11,553	11,783	11,914
Shaft:						
17. Falling down shaft	13		1	20	21	34
18. Objects falling down shaft	4		3	53	56	60
19. Breaking of cables	10		1	2	3	13
20. Overwinding				1	1	1
21. Skip, cage, or bucket	12		7	70	77	89
22. Other causes			5	99	104	104
Total, shaft	39		17	245	262	301
Open-cut:						
1. Falls or slides of rock or ore	5		1	119	120	125
2. Explosives		1	2	13	16	16
3. Haulage	6		1	40	41	47
4. Power shovels			4	23	27	27
5. Falls of persons	1			83	83	84
6. Falls of derricks, boom, etc.				10	10	10
7. Run or fall of ore in or from ore bins				8	8	8
8. Machinery	2		5	38	43	45
9. Electricity				2	2	2
10. Hand tools				76	76	76
11. Handling materials			3	166	169	169
12. Other causes			2	137	139	139
Total, open-cut	14	1	18	715	734	748
Surface:						
1. Mine cars, mine locomotives, gravity or aerial trams	1		3	82	85	86
2. Railway cars and locomotives	1		1	19	20	21
3. Run or fall of ore in or from ore bins				27	27	27
4. Falls of persons	3		4	253	257	260
5. Stepping on nail				60	60	60
6. Hand tools			2	186	188	188
7. Electricity	2		1	25	26	28
8. Machinery	1		11	249	260	261
9. Handling materials	1		3	499	502	503
10. Other causes	6		4	442	446	452
Total, surface	15		29	1,842	1,871	1,886
Grand total, 1936	199	5	290	14,355	14,650	14,849
Grand total, 1935	164	7	246	9,953	10,206	10,370

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, 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 the remainder of day of accident.

18 METAL-MINE ACCIDENTS IN THE UNITED STATES: 1936

TABLE 10.—All mines: Causes of fatalities and injuries, showing percentage due to each cause and corresponding rates per million man-hours during the year ended Dec. 31, 1936

Cause of accident	Number killed				Number injured			
	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
Underground:								
1. Fall of rock or ore from roof or wall	30.15	45.80	0.30	0.47	17.11	21.27	12.39	19.69
2. Rock or ore while loading at working face					7.11	8.84	5.14	8.18
3. Hand tools					5.67	7.05	4.10	6.52
4. Explosives	11.56	17.56	.11	.18	.62	.77	.45	.71
5. Haulage	6.03	9.16	.06	.09	9.88	12.29	7.16	11.38
6. Falling down chute, winze, raise, or stope	6.53	9.93	.06	.10	3.46	4.30	2.50	3.98
7. Run of ore from chute or pocket	.50	.76	.01	.01	3.24	4.03	2.35	3.73
8. Drilling					7.32	9.11	5.30	8.43
9. Electricity					.23	.28	.16	.26
10. Machinery	.50	.76	.01	.01	1.84	2.28	1.33	2.12
11. Mine fires					.05	.07	.04	.06
12. Suffocation from natural gases	3.52	5.34	.03	.06	.14	.18	.11	.17
13. Inrush of water					.03	.03	.02	.03
14. Stepping on nail					1.33	1.66	.97	1.54
15. Handling materials (other than rock or ore)	2.01	3.05	.02	.03	10.41	12.94	7.54	11.98
16. Other causes	5.03	7.64	.05	.08	11.99	14.90	8.68	13.79
Total, underground	65.83	100.00	0.65	1.03	80.43	100.00	58.24	97.57
Shaft:								
17. Falling down shaft	6.53	33.33	0.06	0.10	0.14	8.02	0.10	0.16
18. Objects falling down shaft	2.01	10.26	.02	.03	.38	21.37	.28	.44
19. Breaking of cables	5.03	25.64	.05	.08	.02	1.14	.01	.02
20. Overwinding					.01	.38	.01	.01
21. Skip, cage, or bucket	6.03	30.77	.06	.10	.53	29.39	.38	.60
22. Other causes					.71	39.70	.51	.82
Total, shaft	19.60	100.00	0.19	0.31	1.79	100.00	1.29	2.05
Open-cut:								
1. Falls or slides of rock or ore	2.51	35.71	0.02	0.20	0.82	16.35	0.59	0.87
2. Explosives					.11	2.18	.08	.12
3. Haulage	3.01	42.86	.03	.25	.28	5.59	.20	.30
4. Power shovels					.18	3.68	.13	.20
5. Falls of persons	.50	7.14	.01	.04	.57	11.31	.41	.60
6. Falls of derricks, booms, etc.					.07	1.36	.05	.07
7. Run or fall of ore in or from ore bins					.06	1.09	.04	.06
8. Machinery	1.01	14.29	.01	.08	.29	5.86	.21	.31
9. Electricity					.01	.27	.01	.02
10. Hand tools					.52	10.35	.38	.55
11. Handling materials					1.15	23.02	.84	1.23
12. Other causes					.95	18.94	.69	1.01
Total, open-cut	7.03	100.00	0.07	0.57	5.01	100.00	3.63	5.34
Surface:								
1. Mine cars, mine locomotives, gravity or aerial trams	0.50	6.67	0.01	0.02	0.58	4.54	0.42	0.83
2. Railway cars and locomotives	.50	6.67	.01	.02	.14	1.07	.10	.20
3. Run or fall of ore in or from ore bins					.18	1.44	.13	.26
4. Falls of persons	1.51	20.00	.01	.06	1.75	13.73	1.27	2.52
5. Stepping on nail					.41	3.21	.30	.59
6. Hand tools					1.28	10.05	.93	1.84
7. Electricity	1.01	13.33	.01	.04	.18	1.39	.13	.26
8. Machinery	.50	6.67	.01	.02	1.78	13.90	1.28	2.55
9. Handling materials	.50	6.67	.01	.02	3.43	26.83	2.48	4.92
10. Other causes	3.02	40.00	.03	.12	3.04	23.84	2.20	4.37
Total, surface	7.54	100.00	0.07	0.30	12.77	100.00	9.24	18.34
Grand total, 1936	100.00		0.98		100.00		72.40	
Grand total, 1935	100.00		1.02		100.00		63.27	

CLASSIFICATION OF ACCIDENTS BY KIND OF MINE

Copper mines.—Companies operating mines whose chief output was copper ore reported a large increase (38 percent) in number of men employed in 1936 compared with 1935. An even larger proportionate increase was reported in the number of man-hours worked by the industry, the volume of labor being 57 percent greater in 1936 than in 1935. An increase in the number of accidents was to be expected owing to the increase in employment; however, the number of accidents rose more rapidly than did employment, with the result that the accident-frequency rate per million man-hours worked was higher in 1936 than in 1935. The rate for nonfatal and fatal injuries combined was 81.86 in 1936 compared with 66.61 in 1935. The figures for 1936 included a fatality rate of 1.09 and a nonfatal-injury rate of 80.77.

The actual number of men working at copper mines in 1936 was 14,102, an increase of 3,914 men over 1935. Employment for all mines totaled 4.4 million man-days or 34.9 million man-hours, an average working year of 309 days, or 2,475 hours per man. Thirty-eight men were killed and 2,819 men injured by accidents in and about the mines during the year. For each million man-hours of employment or exposure of the men to the hazards of their occupations, the fatality rate was 1.09 and the nonfatal injury rate 80.77. Each of these figures represents an increase over the corresponding rate for 1935, for which year the fatality rate was 0.85 and the injury rate 65.76. The higher rates for 1936 were reported for both underground and open-pit mining, as well as for work above ground at underground mines, except that the fatality rate for surface work at underground mines decreased.

The number of men employed at mines which produced chiefly copper ore and the number and causes of accidental injuries and deaths among employees in 1936 are shown in tables 2, 11, 12, and 21.

TABLE 11.—Copper mines: Men employed and man-days of employment, by States, during the year ended Dec. 31, 1936

State	Num-ber of opera-tors	Num-ber of min-ers	Men employed			Man-days of employment			Average hours of employment per man per day			Average days active				
			Under-ground	Open-cut	Sur-face	Under-ground	Open-cut	Sur-face	Under-ground	Open-cut	Sur-face	Under-ground	Open-cut	Sur-face	Total	
																Total
Arizona.....	24	32	2,482	792	713	3,987	764,716	235,467	211,889	8.00	8.00	8.00	308	297	297	304
Idaho and Montana.....	9	36	4,419	1,086	5,505	1,322,371	325,514	1,647,885	8.00	8.17	8.03	299	300	299	300	299
Nevada.....	5	6	166	222	189	63,992	56,971	78,728	8.00	7.99	8.00	343	339	332	339	337
Utah.....	6	7	26	804	304	1,134	7,405	293,925	111,013	8.00	8.00	8.00	285	366	365	364
Alaska, California, Oregon, and Washington.....	11	12	452	-----	78	530	146,092	-----	23,590	8.04	8.02	-----	323	-----	302	320
Colorado and New Mexico.....	5	5	57	-----	115	172	18,176	-----	42,078	8.00	8.08	-----	319	-----	366	350
Michigan, North Carolina, and Tennessee.....	4	5	1,416	-----	781	2,197	431,332	-----	226,430	8.00	8.00	-----	305	-----	290	299
Total, 1936.....	-----	103	9,018	1,818	3,266	14,102	2,747,063	603,120	1,004,506	8.00	8.06	8.01	305	332	308	309
Total, 1935.....	-----	94	6,203	1,630	2,355	10,188	1,700,447	464,388	622,248	8.00	8.00	8.00	274	285	264	274

TABLE 12.—Copper mines: Number of man-hours of employment and number killed and injured, by States, during the year ended Dec. 31, 1936

State	Man-hours of employment			Average hours per man per year			Number killed			Number injured			Wid-ows	Or-phans		
	Under-ground	Open-cut	Sur-face	Under-ground	Open-cut	Sur-face	Under-ground	Open-cut	Sur-face	Under-ground	Open-cut	Sur-face			Total	
																Total
Arizona.....	6,117,732	1,883,738	1,695,120	2,465	2,378	2,377	2,432	2,377	2,432	2	1	14	41	633	11	17
Idaho and Montana.....	10,578,868	2,660,104	13,238,972	2,394	2,449	2,405	2,405	2,449	2,405	11	1	12	123	1,568	(1)	(1)
Nevada.....	455,768	589,284	511,936	2,746	2,654	2,698	2,698	2,709	2,698	6	1	7	23	120	2	4
Utah.....	59,240	2,351,400	888,104	2,278	2,925	2,921	2,909	2,921	2,909	2	1	3	3	48	1	-----
Alaska, California, Oregon, and Washington.....	1,170,336	-----	189,680	2,589	-----	2,432	2,566	-----	2,566	-----	-----	222	14	236	-----	-----
Colorado and New Mexico.....	150,263	-----	336,624	2,635	-----	2,927	2,831	-----	2,831	-----	-----	11	15	26	-----	-----
Michigan, North Carolina, and Tennessee.....	3,450,651	-----	1,811,439	2,437	-----	2,319	2,395	-----	2,395	2	-----	166	22	188	1	-----
Total 1936.....	21,982,858	4,824,422	8,093,007	2,438	2,654	2,478	2,475	2,478	2,475	30	5	38	89	2,819	(1)	(1)
Total, 1935.....	13,603,172	3,715,102	4,974,961	2,193	2,279	2,113	2,188	2,113	2,188	14	1	19	131	1,466	(1)	(1)

1 Not available.

Gold, silver, and miscellaneous metal mines.—Reference has already been made to accidents and employment at mines whose chief output was copper ore. Subsequent paragraphs deal with accidents and employment at lead and zinc mines in the Mississippi Valley States and at iron-ore mines in all States. The paragraphs immediately following relate to all other classes of metal mines, that is, to gold and silver mines in all States, to mines producing some copper ore but chiefly some metal other than copper, and to mines producing manganese, tungsten, or some other minor metal.

This group of mines employed 51,162 men in 1936, a reduction of 1,856 men, or about 4 percent, compared with 1935. A slight difference in coverage for the 2 years might account for the small apparent change in number of men employed, although both canvasses were conducted as thoroughly as possible. Measured by man-hours of labor performed, the industry worked 98.9 million man-hours in 1936 compared with 88.6 million in 1935. The total number of men employed in 1936 included 37,574 men at lode mines, 10,393 men at placer mines, and 3,195 men employed at minor-metal mines.

A total of 111 deaths and 9,227 nonfatal lost-time injuries resulted from accidents to employees while at work. These figures represent a fatality rate of 1.12 and an injury rate of 93.31 per million man-hours worked at all mines included in the group. In 1935 the fatality rate was 1.21 and the injury rate 77.08; thus the rates in 1936 represent a decrease for fatal accidents but an increase for nonfatal injuries.

California was by far the principal State in number of men employed at the mines. Other leading States were Colorado, Idaho, Arizona, Alaska, Nevada, Montana, and Utah.

Table 2 shows the number of employees and the number of accidents at the three classes of mines in this group for 1936. Tables 13 and 14 give a distribution by States of employment and accident data for the three groups combined. The number and causes of accidents that occurred at the mines during 1936 are shown in table 21.

TABLE 13.—Gold, silver (lode and placer), and miscellaneous metal mines: Men employed and man-days of employment by States, during the year ended Dec. 31, 1936

State	Num-ber of oper-ators	Num-ber of mines	Men employed			Man-days of employment			Average hours of employment per man per day			Average days active						
			Under-ground	Open-cut	Sur-face	Total	Under-ground	Open-cut	Sur-face	Total	Under-ground	Open-cut	Sur-face	Total				
Alabama.....	6	7	85	5	13	103	27,662	895	4,688	33,245	8.83	7.08	9.00	8.80	327	179	361	323
Alaska.....	(1)	531	940	582	2,445	3,967	250,942	93,060	519,779	863,781	8.00	8.00	8.00	8.00	267	160	213	218
Arizona.....	1,153	1,160	2,680	64	1,239	3,983	657,316	7,377	155,981	820,674	7.97	7.99	7.97	7.97	245	115	126	206
Arkansas.....	14	15	272	223	54	3,459	71,915	33,459	13,211	118,585	8.02	8.00	8.00	8.01	264	150	240	216
California.....	1,794	1,830	7,625	758	4,116	12,449	2,213,432	145,312	1,072,886	3,430,830	7.99	7.88	7.97	7.98	290	192	260	274
Colorado.....	666	784	4,725	198	1,207	6,130	1,146,724	40,667	264,835	1,452,226	7.99	8.01	8.04	8.00	243	205	219	287
Georgia.....	37	37	167	36	1,328	4,882	28,735	1,715	11,138	41,648	8.03	10.00	8.56	8.25	172	48	70	115
Idaho.....	676	698	3,428	126	1,328	4,882	862,746	12,176	283,152	1,158,077	7.98	8.66	7.97	7.98	252	97	213	237
Minnesota.....	3	3	50	81	43	1374	15,000	17,376	11,838	44,214	8.00	8.00	8.00	8.00	300	215	275	254
Montana.....	825	840	2,571	95	1,039	3,705	554,571	13,665	152,331	720,567	8.02	8.01	8.05	8.02	216	144	147	194
Nevada.....	681	699	2,963	250	643	3,756	650,514	47,849	109,201	807,564	8.72	8.10	9.04	8.75	220	191	201	215
New Mexico.....	62	98	1,590	15	217	3,762	440,461	47,770	157,955	499,186	7.76	8.00	7.84	7.75	188	51	267	263
North Carolina.....	15	15	535	108	478	1,501	7,711	1,050	10,588	20,244	7.90	8.00	8.00	8.00	187	70	145	143
Oregon.....	276	282	1,501	28	73	1,501	103,180	24,097	105,050	232,377	7.90	7.82	8.07	8.00	197	122	220	168
South Carolina.....	5	5	66	10	23	99	15,150	780	6,454	25,344	8.28	8.00	8.00	8.00	260	75	281	266
South Dakota.....	41	44	1,157	77	663	1,897	355,185	18,565	228,027	607,765	8.00	8.00	8.00	8.00	307	261	344	317
Tennessee.....	7	8	225	16	33	274	40,401	1,480	5,674	47,565	8.06	9.41	8.15	8.12	180	83	172	174
Texas.....	6	6	275	15	24	314	88,968	4,584	7,692	101,194	7.72	7.87	7.76	7.75	323	303	321	322
Utah.....	179	198	3,109	64	332	3,565	813,208	11,896	80,161	900,269	7.99	8.00	8.00	7.99	238	186	241	265
Virginia.....	11	11	248	33	336	65,135	66,135	7,587	8,587	81,319	8.07	8.02	7.91	8.05	263	138	260	242
Washington.....	137	138	346	17	201	564	69,063	7,222	23,765	95,580	7.95	8.00	8.00	7.97	200	42	118	116
Wyoming.....	30	31	469	15	92	156	7,085	1,343	7,604	16,032	7.98	8.46	8.01	8.04	145	90	83	103
Maryland, Michigan, Missouri, and West Virginia.....	7	7	45	32	-----	77	10,897	5,475	-----	16,372	8.00	8.03	-----	242	171	-----	212	
New Jersey, New York, and Vermont.....	3	5	576	4	85	665	155,947	128	23,555	178,630	7.71	8.00	7.84	7.72	271	32	265	269
Total, 1936.....	(1)	7,433	33,758	2,964	14,440	51,162	8,660,968	492,879	3,162,347	12,316,194	8.03	7.99	8.03	8.03	257	166	219	241
Total, 1935.....	(1)	9,866	32,089	3,386	17,543	53,018	7,415,192	538,302	3,256,295	11,209,789	7.88	7.94	7.95	7.90	231	159	186	211

1 Not available.

TABLE 14.—Gold, silver (lode and placer), and miscellaneous metal mines: Number of man-hours of employment and number killed and injured, by States, during the year ended Dec. 31, 1936

State	Man-hours of employment			Average hours per man per year			Number killed			Number injured			Wid-ows	Or-phaans
	Under-ground	Open-cut	Surface	Total	Under-ground	Open-cut	Sur-face	Total	Under-ground	Open-cut	Sur-face	Total		
Alabama.....	244,118	6,338	42,182	292,638	2,872	1,298	3,245	2,841	10	194	127	10	(1)	
Alaska.....	2,007,536	744,480	4,158,232	6,910,248	2,136	1,279	1,703	1,742	10	574	122	321	3	(1)
Arizona.....	5,293,716	1,243,181	6,538,853	6,538,853	1,954	1,621	1,003	1,642	3	3	3	696	1	5
Arkansas.....	17,682,563	267,670	8,543,689	6,845,952	2,120	1,200	1,957	1,730	28	28	3	31	1	7
California.....	17,682,563	1,145,519	8,543,689	27,872,400	2,319	1,511	2,076	2,190	19	1,955	450	2,477	11	7
Colorado.....	9,927,726	325,576	2,128,700	11,345,974	1,940	1,644	1,764	1,896	26	1,057	173	1,235	6	10
Georgia.....	6,823,133	105,593	2,957,883	9,245,530	2,008	1,476	1,590	1,850	3	5	3	8		
Idaho.....	120,000	130,008	9,474,706	9,245,530	2,400	837	1,700	1,894	24	1,212	103	1,316	12	17
Illinois.....	4,439,884	100,480	1,294,276	5,785,640	1,731	1,152	1,180	1,562	6	463	85	581	5	5
Indiana.....	3,669,484	383,426	867,436	7,040,330	1,913	1,534	1,818	1,874	3	559	59	627	2	2
Iowa.....	3,419,327	6,255	442,831	3,868,144	2,225	1,416	2,038	2,105	3	401	38	439	2	2
Kansas.....	75,196	13,900	80,560	1,821,100	1,565	557	1,238	1,275	5	5	3	8		
Michigan.....	821,695	188,346	847,766	1,827,907	2,402	957	1,773	2,247	83	11	21	115		
Minnesota.....	138,948	6,000	57,322	4,814,354	2,492	600	2,518	2,538	12	12	1	14		
Missouri.....	325,516	14,320	46,250	385,096	2,438	1,829	2,753	2,753	3	205	24	231	2	2
Montana.....	6,540,732	35,752	59,676	7,82,232	2,498	2,885	4,02	4,401	26	85	5	53		
Nebraska.....	686,864	33,136	641,283	7,277,141	2,064	2,885	2,487	2,401	9	792	2	856	7	14
Nevada.....	325,631	60,956	67,956	654,523	2,119	1,487	2,059	1,948	1	34	1	49	1	
New York.....	549,609	3,776	190,120	745,505	1,595	340	946	1,322	1	1	15	49	1	
North Carolina.....	56,567	11,356	60,941	128,864	1,154	757	662	826						
Ohio.....	87,176	43,963		131,139	1,937	1,374		1,703	1	1		1		
Oklahoma.....	1,201,799	1,024	176,835	1,379,658	2,086	256	2,080	2,075	1	51	3	54	1	1
Oregon.....	69,558,952	3,936,092	25,391,463	98,886,507	2,061	1,328	1,758	1,933	98	111	9	1,304	111	9,297
Pennsylvania.....	58,418,137	4,271,389	25,877,194	88,566,720	1,821	1,262	1,475	1,671	88	107	15	1,086	152	6,827
Texas.....														
Utah.....														
Virginia.....														
Washington.....														
West Virginia.....														
Wisconsin.....														
Wyoming.....														
Total, 1936.....	69,558,952	3,936,092	25,391,463	98,886,507	2,061	1,328	1,758	1,933	98	111	9	1,304	111	9,297
Total, 1935.....	58,418,137	4,271,389	25,877,194	88,566,720	1,821	1,262	1,475	1,671	88	107	15	1,086	152	6,827

1 Not available.

Iron mines.—Increases of 32 percent in number of employees and 41 percent in number of man-hours worked were shown by reports from companies operating iron-ore mines in 1936. The number of accidents also increased, as did the accident-frequency rate per million man-hours worked. The reports from the operating companies showed a fatality rate of 0.84 and an injury rate of 25.02 in 1936 compared with a fatality rate of 0.89 and an injury rate of 17.83 in 1935.

The total working force at the mines in 1936 was 18,592 men, an increase of 4,551 men over 1935. Working time for the industry as a whole was 4.3 million man-days or 34.7 million man-hours, an average of 232 days or 1,866 hours per employee. Accidents in and about the mines killed 29 employees and injured 868.

Michigan led all other States in number of men employed underground, while Minnesota was the leading State in number of men engaged in iron-ore mining by open-pit methods.

Tables 2, 15, 16, and 21 show the salient features of accidents and employment for the iron-mining industry in 1936.

TABLE 15.—Iron mines: Men employed and man-days of employment, by States, during the year ended Dec. 31, 1936

State	Num-ber of oper-ators	Num-ber of mines	Men employed				Man-days of employment				Average hours of employ-ment per man per day				Average days active			
			Under-ground	Open-cut	Sur-face	Total	Under-ground	Open-cut	Sur-face	Total	Under-ground	Open-cut	Sur-face	Total	Under-ground	Open-cut	Sur-face	Total
Alabama.....	41	46	2,491	554	574	3,619	560,662	113,737	124,639	799,038	8.00	8.76	8.02	8.11	225	198	217	221
Michigan.....	22	44	3,347	233	1,651	5,231	398,979	23,959	414,023	1,342,961	8.00	8.06	8.03	8.01	269	129	251	257
Minnesota.....	25	56	2,105	4,031	1,420	7,556	497,006	791,429	370,783	1,659,218	7.98	8.01	8.00	8.00	236	196	261	220
New York.....	4	4	536	5	160	701	152,239	791,581	47,312	200,132	8.00	10.00	8.81	8.20	284	116	296	285
New Jersey and Pennsyl- vania.....	4	5	264	130	82	476	53,417	36,668	20,147	110,247	8.00	8.00	8.00	8.00	202	262	246	232
Georgia, North Carolina, Tennessee and Virginia.....	14	15	13	79	-----	92	500	6,820	-----	7,820	8.00	9.27	-----	39	86	-----	80	
California, Nevada, New Mexico, Utah, Washing- ton and Wyoming.....	12	13	168	137	43	348	34,711	13,706	9,100	57,517	8.00	8.12	8.00	8.03	207	100	212	165
Missouri and Wisconsin.....	5	5	406	7	156	569	102,017	335	38,092	141,444	7.89	8.00	8.00	8.00	251	48	250	249
Total, 1936.....	127	193	9,330	5,176	4,086	18,592	2,289,531	983,250	1,025,066	4,317,877	8.00	8.11	8.05	8.03	246	192	251	232
Total, 1935.....	-----	174	7,691	3,213	3,137	14,041	1,676,333	684,138	710,237	3,076,768	8.00	8.10	8.01	8.02	218	213	228	219

Lead and zinc mines (Mississippi Valley States).—This group of mines, which in addition to the lead and zinc mines in the Mississippi Valley States includes fluorspar mines in Illinois and Kentucky, reported virtually no change in the number of men working at the mines in 1936 compared with 1935, the actual number of employees in 1936 being 6,696 men. However, a large increase was reported in the total volume of labor performed. The number of man-hours worked at all mines was 12.3 million in 1936 compared with 9.6 million in 1935, a gain of 28 percent.

A gratifying gain in accident prevention was also reported in 1936, the injury rate being only 56.15, substantially lower than the 1935 rate of 68.81. The fatality rate of 1.38 in 1936 was not as favorable as the corresponding rate of 0.94 in 1935.

Oklahoma and Missouri were the principal mining States in 1936, when measured by number of men working at the mines.

The number of employees in each State, as well as the number of accidents to the workers, are shown in tables 17 and 18. Table 2 gives comparative data for lead and zinc mines and for other classes of mines. Table 21 shows the number and causes of accidents in 1936 according to the severity of the resulting injuries.

TABLE 17.—Lead and zinc mines¹ (Mississippi Valley): Men employed and man-days of employment, by States, during the year ended, Dec. 31, 1936

State	Number of operators		Number of mines		Men employed			Man-days of employment			Average hours of employment per man per day				Average days active					
	Under-ground	Surface	Open-cut	Total	Under-ground	Open-cut	Total	Under-ground	Open-cut	Total	Under-ground	Open-cut	Total	Under-ground	Open-cut	Total	Under-ground	Open-cut	Total	
																				Under-ground
Illinois.....	17	288	39	128	455	76,707	11,180	36,977	194,164	8.12	9.28	8.00	8.19	266	287	283	273			
Kansas.....	21	918	10	73	1,001	211,566	2,200	7,821	231,586	8.00	8.40	8.04	8.00	230	220	244	231			
Kentucky.....	48	55	15	160	1,887	91,663	1,600	33,688	326,891	8.04	8.06	8.05	8.06	222	107	210	216			
Missouri.....	17	25	40	53	1,644	369,484	4,500	11,660	356,044	8.03	8.00	8.03	8.00	238	113	220	285			
Oklahoma.....	43	67	10	136	2,195	453,604	750	20,847	475,201	8.03	8.00	7.81	8.02	221	75	153	216			
Tennessee.....	3	370	40	119	529	98,465	10,000	40,686	149,151	8.02	10.00	8.02	8.15	266	280	342	282			
Wisconsin and Arkansas.....	13	239	46	285	625	32,666	-----	7,234	39,900	8.00	-----	8.00	8.00	137	-----	157	140			
Total, 1936.....	-----	5,827	154	626	6,696	1,384,154	30,230	168,113	1,532,497	8.02	9.19	8.00	8.04	229	196	235	229			
Total, 1935.....	-----	5,924	178	626	6,728	1,032,684	36,704	123,013	1,192,401	7.99	9.41	8.09	8.04	174	206	197	177			

¹ Includes fluorspar mines in Illinois and Kentucky.

TABLE 18.—Lead and zinc mines¹ (Mississippi Valley): Number of man-hours of employment and number killed and injured, by States, during the year ended Dec. 31, 1936

State	Man-hours of employment			Average hours per man per year			Number killed			Number injured			Wid-ows	Or-phans			
	Under-ground	Open-cut	Total	Under-ground	Open-cut	Total	Under-ground	Open-cut	Total	Under-ground	Open-cut	Total			Under-ground	Open-cut	Total
Illinois.....	622,712	103,762	1,016,690	2,162	2,267	2,234	4	1	5	28	4	32	-----	-----	8		
Kansas.....	1,692,793	17,600	1,853,705	1,844	1,963	1,741	3	-----	1	116	88	3	119	2	-----		
Kentucky.....	737,109	14,500	1,021,847	1,789	1,689	1,741	-----	-----	4	88	1	21	110	-----	-----		
Missouri.....	2,057,128	36,000	3,085,736	1,906	900	1,877	3	-----	3	118	-----	3	118	3	14		
Oklahoma.....	3,841,682	6,000	3,810,766	1,777	600	1,756	3	-----	3	264	-----	3	267	2	-----		
Tennessee.....	789,216	100,000	1,215,507	2,133	2,500	2,298	2	-----	2	16	3	5	24	2	4		
Wisconsin and Arkansas.....	-----	-----	319,192	1,093	1,258	1,120	-----	-----	-----	22	-----	22	-----	-----	-----		
Total, 1936.....	10,701,298	977,862	12,328,443	1,804	1,880	1,840	15	1	17	652	8	32	692	9	26		
Total, 1935.....	8,251,745	345,262	9,391,745	1,393	1,589	1,426	8	-----	9	607	-----	53	660	6	22		

¹ Includes fluorspar mines in Illinois and Kentucky.

Nonmetallic-mineral mines.—A gain of 24 percent was reported in number of men employed at non-metallic-mineral mines in 1936. This group includes mines producing various nonmetallic minerals, such as phosphate rock, gypsum, sulphur, and rock salt, but it does not include ones producing coal, stone, clay, sand, or gravel. The group as thus defined reported 21.6 million man-hours of employment in 1936 compared with 16.2 million in 1935, a gain of 33 percent. The actual number of men employed was 10,380, an increase of 2,041 over 1935.

Accidents in and about the mines resulted in the death of 4 employees in 1936 and the injury of 1,044, thus indicating a fatality rate of 0.19 and an injury rate of 48.43. Both of these rates show improvement compared with the fatality rate of 0.43 and injury rate of 50.28 in 1935.

The outstanding States in number of men employed were Texas and Florida, although California, New York, and Tennessee also employed a relatively large number of men.

Table 2 shows the number of employees and the number of accidents at nonmetallic-mineral mines, together with comparative figures for other classes of mines. The number of workers and the number of accidents at nonmetal mines in each State are shown in tables 19 and 20. Table 21 shows the number and causes of accidents according to severity of injury.

TABLE 19.—Nonmetallic-mineral mines: Men employed and man-days of employment, by States, during the year ended Dec. 31, 1936

State	Num-ber of oper-ators	Num-ber of mines	Men employed				Man-days of employment				Average hours of employ-ment per man per day				Average days active			
			Under-ground	Open-cut	Sur-face	Total	Under-ground	Open-cut	Sur-face	Total	Under-ground	Open-cut	Sur-face	Total	Under-ground	Open-cut	Sur-face	Total
California.....	64	66	491	211	122	824	134,852	45,522	34,084	215,358	8.00	8.01	8.06	8.01	275	216	287	261
Colorado.....	20	21	59	58	12	129	8,580	14,254	1,813	24,617	8.87	8.18	8.00	7.95	145	246	151	191
Connecticut.....	6	7	44	1	13	58	8,399	1,238	10,993	8.89	7.40	9.00	8.89	194	39	185	190	
Florida.....	20	16	699	410	25	1,134	159,224	18,006	277,348	8.01	8.71	8.65	8.68	228	228	288	250	
Georgia.....	14	14	44	76	115	130	20,830	3,283	8,790	21,013	8.01	7.40	8.00	7.81	212	219	350	239
Iowa.....	14	13	96	21	3	120	54,427	3,082	67,693	8.00	8.12	7.99	8.01	217	157	263	208	
Kansas.....	13	13	244	20	37	322	33,653	21,994	127,677	169,310	8.00	8.12	7.99	8.01	223	154	246	221
Louisiana.....	5	5	147	3	116	159	30,306	2,874	92,270	8.00	8.12	7.97	7.88	229	340	340	309	
Maine.....	36	37	3	116	119	119	3,009	21,994	92,270	8.00	8.12	7.97	7.88	229	340	340	309	
Michigan.....	7	7	154	49	32	235	32,845	12,874	9,245	54,944	7.61	8.01	7.60	7.70	102	263	289	234
Missouri.....	63	64	33	415	448	448	10,230	85,662	93,892	8.00	8.01	7.79	7.79	310	206	206	214	
Montana.....	6	6	393	7	27	427	126,190	850	9,018	136,982	8.00	7.88	8.00	7.94	321	121	334	319
Nevada.....	11	11	27	64	5	96	6,192	11,124	1,221	18,537	8.00	8.00	8.00	8.00	229	174	244	193
New Hampshire.....	10	15	39	96	5	140	18,684	18,684	31,339	50,477	8.00	8.00	8.00	8.00	325	194	232	232
New Mexico.....	6	6	247	9	58	314	73,898	19,456	36,189	108,244	7.47	8.00	8.00	8.00	94	269	374	307
New York.....	20	24	523	71	125	719	117,852	73,771	1,349	196,467	8.00	8.00	8.00	8.00	225	274	290	241
North Carolina.....	32	35	144	330	9	483	31,144	7,300	5,536	91,880	8.00	8.00	8.00	8.00	225	274	290	241
Ohio.....	5	5	80	29	2	111	8,503	85,336	79,176	197,661	8.00	8.00	8.00	8.00	225	274	290	241
Oklahoma.....	8	8	4	346	22	372	1,008	101,065	79,176	197,661	8.00	8.00	8.00	8.00	225	274	290	241
Tennessee.....	15	15	67	363	284	714	17,420	101,065	79,176	197,661	8.00	8.00	8.00	8.00	225	274	290	241
Texas.....	19	22	76	138	1,124	1,338	15,924	32,398	398,895	447,767	7.97	8.01	8.00	8.00	216	230	158	145
Utah.....	14	23	86	112	47	245	22,107	23,398	8,417	58,922	8.00	8.00	8.00	8.00	217	217	252	247
Vermont.....	5	5	18	118	5	141	6,060	20,893	1,467	28,420	8.00	8.00	8.00	8.00	217	217	252	247
Virginia.....	12	14	137	187	21	345	33,250	40,122	57,647	131,019	7.37	8.48	7.91	8.00	243	215	261	240
Washington.....	7	8	15	93	8	116	2,969	27,328	2,742	33,039	7.99	8.00	8.00	8.00	198	294	343	285
Alabama, Arkansas, Illinois, Indiana, and Kentucky.....	15	16	152	172	37	361	23,892	34,960	6,045	64,897	11.22	8.67	9.55	8.69	157	203	163	180
Arizona and Idaho.....	6	6	59	9	20	88	16,123	1,125	5,835	23,058	8.00	8.00	8.00	8.00	273	125	292	262
Massachusetts, New Jersey, Pennsylvania, Maryland, and West Virginia.....	18	18	5	90	---	95	1,242	23,499	---	24,741	8.03	8.28	8.27	248	261	---	260	
Nebraska, Oregon, South Dakota, and Wyoming.....	10	10	7	63	---	70	978	17,015	---	17,993	6.06	8.04	7.93	140	270	---	257	
Total, 1936.....	---	515	3,394	3,963	3,023	10,380	830,969	599,206	948,473	2,688,648	8.00	8.34	7.72	8.02	245	229	314	259
Total, 1935.....	---	495	2,498	3,481	2,360	8,339	574,048	763,333	748,950	2,086,331	7.90	8.31	7.06	7.75	230	219	317	250

TABLE 20.—Nonmetallic-mineral mines: Number of man-hours of employment and number killed and injured, by States, during the year ended Dec. 31, 1936

State	Man-hours of employment			Average hours per man per year			Number killed			Number injured				Wid-ows	Or-phans			
	Under-ground	Open-cut	Surface	Total	Under-ground	Open-cut	Sur-face	Total	Under-ground	Open-cut	Sur-face	Total	Under-ground			Open-cut	Sur-face	Total
California.....	1, 078, 659	364, 831	282, 142	1, 725, 632	2, 197	1, 729	2, 313	2, 094	1				77	15	10	102		
Colorado.....	64, 220	116, 544	14, 504	195, 268	1, 088	2, 009	1, 514	1, 514					2	9	3	14		
Connecticut.....	75, 776	308	21, 658	97, 752	1, 722	308	1, 685	1, 685					15			15		
Florida.....	1, 386, 740	1, 021, 190	2, 407, 930	2, 407, 930	1, 984	2, 491	2, 171	2, 171					37	27		64		
Georgia.....	74, 601	139, 490	87, 500	301, 591	1, 695	1, 835	2, 080	2, 080		1			7	6		13		
Iowa.....	163, 624	24, 659	6, 320	194, 603	1, 704	1, 174	2, 107	1, 622					39	1		40		
Kansas.....	435, 698	25, 015	72, 834	533, 447	1, 785	1, 251	1, 968	1, 772					14			14		
Louisiana.....	254, 413	1, 017, 386	1, 271, 799	1, 271, 799	1, 731	1, 537	2, 436	2, 436					3	21		24		
Maine.....	2, 448	178, 299	70, 259	180, 747	1, 624	1, 537	1, 519	1, 519					12	2		14		
Michigan.....	250, 077	102, 992	423, 328	776, 397	2, 102	2, 102	1, 801	1, 801					1	14		15		
Minnesota.....	61, 342	685, 778	747, 120	1, 454, 240	1, 859	1, 652	1, 668	1, 668					9			9		
Missouri.....	1, 099, 522	6, 800	64, 144	1, 080, 466	2, 569	1, 971	2, 376	2, 550					4	1		5		
Montana.....	49, 536	88, 988	9, 768	148, 292	1, 835	1, 390	1, 954	1, 545					3			3		
Nevada.....	101, 535	157, 850	173, 795	432, 180	2, 234	748	2, 985	2, 332					37			37		
New Hampshire.....	551, 721	6, 734	289, 514	847, 969	2, 074	2, 074	1, 968	1, 968	1				25	5		30		
New Mexico.....	895, 521	610, 516	10, 795	1, 516, 832	1, 780	1, 850	1, 199	1, 817		1			41	43		84		
New York.....	256, 331	6, 800	877, 642	1, 140, 573	1, 784	1, 970	1, 264	1, 200					102			102		
North Carolina.....	62, 680	681, 676	44, 288	1, 111, 644	2, 016	1, 970	2, 485	2, 573					4	37		41		
Ohio.....	8, 064	174, 200	931, 528	1, 111, 792	2, 000	2, 566	2, 485	2, 573					19	9		28		
Oklahoma.....	126, 875	263, 792	705, 660	1, 096, 327	1, 669	1, 912	1, 495	1, 677					16	18		34		
Tennessee.....	471, 708	168, 822	2, 764, 592	3, 155, 257	1, 997	1, 507	1, 507	1, 507					5	31		36		
Texas.....	48, 480	185, 544	11, 736	245, 760	2, 693	1, 572	2, 347	1, 743					5	19		24		
Vermont.....	251, 808	340, 222	456, 240	1, 048, 270	1, 819	1, 819	2, 064	1, 923					13	13		26		
Virginia.....	23, 732	218, 624	21, 936	264, 292	1, 582	2, 351	2, 742	2, 278					18	43		61		
Washington.....	268, 077	303, 136	57, 708	628, 921	1, 764	1, 762	1, 560	1, 742					20	1		21		
Wisconsin.....	128, 986	9, 005	46, 660	184, 651	2, 186	1, 001	2, 333	2, 098					6			6		
Wyoming.....	9, 978	194, 559		204, 537	1, 996	2, 162		2, 163					7			7		
Alabama.....																		
Arkansas.....																		
Illinois.....																		
Indiana.....																		
Kentucky.....																		
Arizona and Idaho.....																		
Massachusetts.....																		
New Jersey.....																		
Pennsylvania.....																		
Maryland.....																		
West Virginia.....																		
Nebraska.....																		
Oregon.....																		
South Dakota.....																		
Washington.....																		
Wyoming.....																		
Total, 1936.....	4, 534, 800	6, 345, 710	5, 287, 707	16, 168, 307	1, 815	1, 823	2, 241	1, 939	4	1	2	4	380	429	235	1, 044		
Total, 1935.....													303	246	264	813		
Total, 1934.....													1	7	235	8		
Total, 1933.....													3	1	2	6		
Total, 1932.....													4	1	2	7		
Total, 1931.....													3	1	2	6		
Total, 1930.....													4	1	2	7		
Total, 1929.....													3	1	2	6		
Total, 1928.....													4	1	2	7		
Total, 1927.....													3	1	2	6		
Total, 1926.....													4	1	2	7		
Total, 1925.....													3	1	2	6		
Total, 1924.....													4	1	2	7		
Total, 1923.....													3	1	2	6		
Total, 1922.....													4	1	2	7		
Total, 1921.....													3	1	2	6		
Total, 1920.....													4	1	2	7		
Total, 1919.....													3	1	2	6		
Total, 1918.....													4	1	2	7		
Total, 1917.....													3	1	2	6		
Total, 1916.....													4	1	2	7		
Total, 1915.....													3	1	2	6		
Total, 1914.....													4	1	2	7		
Total, 1913.....													3	1	2	6		
Total, 1912.....													4	1	2	7		
Total, 1911.....													3	1	2	6		
Total, 1910.....													4	1	2	7		
Total, 1909.....													3	1	2	6		
Total, 1908.....													4	1	2	7		
Total, 1907.....													3	1	2	6		
Total, 1906.....													4	1	2	7		
Total, 1905.....													3	1	2	6		
Total, 1904.....													4	1	2	7		
Total, 1903.....													3	1	2	6		
Total, 1902.....													4	1	2	7		
Total, 1901.....													3	1	2	6		
Total, 1900.....													4	1	2	7		

REVIEW BY STATES

Of all fatal and nonfatal injuries that occurred at metal and non-metal mines during 1936, more than 66 percent were nonfatal injuries attributable to 10 leading causes of accidents underground. These injury rates, therefore, afford a good index of the relative degree of safety of mine workers from similar hazards in the various States. Table 22 shows the leading causes of accidents and the accident-frequency rate for each cause in the principal mining States. The table shows an average rate of 94.64 nonfatal injuries per million man-hours of exposure to underground hazards for the United States as a whole. The rates for individual States ranged from 21.78 for Minnesota to 176.04 for Idaho. The rates for the chief hazards in the principal mining States are compared in the discussion that follows. Although changes in a State's accident rates from year to year normally indicate progress in the promotion of safety in mining within the State, it should be remembered, when comparing the record of one State with that of another, that the rates for the several States may differ because of inherent differences in mining hazards due to the nature and position of ore bodies and to differences in the methods of mining that must be used to extract the ore.

TABLE 22.—All mines: Nonfatal-injury rates per million man-hours worked underground and in open-cut mines, by principal causes for important States, during the year ended Dec. 31, 1936

Cause	UNDERGROUND													United States	Florida	Utah	Tennessee	Nevada	California	North Carolina	Oklahoma
	Minnesota	Alabama	Michigan	Missouri	Oklahoma	South Dakota	Kansas	United States	Arizona	Nevada	California	New Mexico	Colorado								
Fall of rock or ore from roof or wall.....	4.16	6.55	6.86	1.64	6.85	9.14	0.47	19.69	24.11	28.66	16.99	19.25	28.81	24.21	37.15	8.63	36.38				
Rock of ore while loading at working place.....	3.43	2.54	3.38	9.86	20.27	9.14	26.76	8.18	3.69	9.72	15.54	7.69	6.30	4.87	7.62	29.24	9.60				
Haulage.....	1.47	9.94	2.90	7.56	14.52	11.69	17.88	11.38	11.92	11.50	15.05	10.18	13.32	20.08	17.86	7.31	14.04				
Hand tools.....	1.22	.85	1.93	6.66	5.48	1.76	2.82	6.32	9.38	3.87	13.84	9.11	6.61	10.48	2.37	1.22	19.19				
Drilling.....	.49	.85	3.58	5.26	4.11	4.57	7.99	8.43	9.20	8.26	15.62	14.41	14.84	11.07	2.37	23.14	11.46				
Handling materials (other than rock or ore).....	4.41	1.48	3.96	3.95	4.06	8.43	1.41	11.98	11.04	12.90	5.10	7.68	13.86	12.26	29.97	10.96	24.49				
Falling down chute, winze, raise, or slope.....	.98	.21	1.84	1.31	2.19	2.11	.47	3.99	4.82	4.65	2.43	4.03	4.55	5.02	4.37	2.84	8.17				
Run of ore from chute or pocket.....	.24	.63	4.83	3.33	.28	1.76	---	3.73	4.82	3.24	2.72	7.92	3.82	1.77	2.81	4.87	2.72				
Machinery.....	2.20	.63	1.55	.99	1.92	---	3.29	2.11	1.83	1.15	2.16	3.21	3.86	2.07	3.31	17.87	2.59				
Shaft.....	.24	.21	.87	.99	1.64	.70	5.17	2.06	1.93	1.31	1.70	3.87	3.97	2.22	1.00	5.03	7.59				
All other underground.....	2.94	3.81	6.43	6.98	10.41	23.19	7.04	16.57	19.20	15.71	17.48	19.96	16.13	25.25	15.74	22.33	40.11				
All causes (underground including shaft).....	21.78	27.70	33.83	39.13	72.33	72.39	72.82	94.64	100.63	103.00	109.00	111.71	114.68	119.30	121.57	130.74	176.04				

Cause	OPEN-CUT										
	Minnesota	Arizona	Alabama	Missouri	Utah	United States	Tennessee	Nevada	California	North Carolina	Oklahoma
Handling materials.....	---	---	---	---	3.79	6.49	1.85	9.40	8.56	19.16	24.72
Hand tools.....	2.93	1.02	7.57	6.52	2.76	3.08	1.85	4.70	9.87	9.58	13.69
Falls of persons.....	.77	1.54	5.68	1.30	2.65	3.37	1.85	4.70	9.22	9.58	12.91
Falls or slides of rock or ore.....	1.39	1.52	1.89	5.22	6.44	4.86	3.71	6.58	8.96	4.79	74.16
Machinery.....	.16	1.02	---	---	1.13	1.74	---	.94	2.63	6.38	11.63
Haulage.....	.93	---	---	1.30	2.65	1.66	.93	.94	2.63	9.58	2.91
Power shovels.....	1.24	1.02	---	---	1.44	1.10	---	.94	.06	---	8.73
All other causes.....	.77	5.13	.95	2.61	6.82	7.09	23.17	10.35	14.48	9.58	10.18
All causes (open-cut).....	2.47	11.27	17.04	18.25	25.00	26.75	37.07	38.55	57.93	68.66	148.33

Alabama.—Of 16 important metal-mining States shown in table 22, Alabama ranked second for safety of underground operations, having next to the lowest injury rate per million man-hours of work done underground. Minnesota ranked first. The injury rate for underground work in Alabama mines was 27.70, or less than a third as high as the average rate for all metal mines in the United States. However, the State's rate for underground mining was 9 percent higher than it was in 1935. The higher rate was due chiefly to increased rates for accidents caused by falls of roof or wall and by haulage equipment.

Arizona.—Arizona ranked eighth among the 16 States in number of nonfatal injuries per million man-hours of labor performed underground in its metal mines. The State rate increased 25 percent in 1936 over 1935 and was 6 percent higher than the average rate for the United States. Higher rates in 1936 were reported for several classes of accidents but chiefly for falls of rock or ore and handling materials.

California.—Although the California rate for nonfatal injuries in underground mining work was 18 percent higher than the national average, the State's rate was 20 percent lower or more favorable than in 1935. The improvement was general and was noted in most of the 10 leading causes of accidents in metal mines, as shown in table 22.

Idaho.—The injury rate for mine employees in Idaho was 21 percent higher in 1936 than it was in 1935. In 1936 the State's rate was 86 percent higher than the average rate for metal mines in the United States. The 1936 rate increased over the 1935 level because of higher injury rates for accidents due to haulage, hand tools, and handling materials. Compared with the national averages for metal mining, the rates for mines in Idaho were much higher for accidents from falling rock or ore, hand tools, and handling materials.

Kansas.—The accident-prevention record of mines in Kansas was favorable in 1936, whether compared with the United States accident rate for that year or with the rate for Kansas mines in 1935. The 1936 rate was 23 percent lower than the national average and 19 percent lower than the rate for the State in 1935. Lower injury rates for falls of rock or ore at the face and for accidents from miscellaneous causes underground accounted for the net reduction in the State's rate in 1936.

Michigan.—An increase of 29 percent in its injury rate for underground mining operations was reported by the mining companies of Michigan. The increase was due chiefly to accidents from falling rock or ore, loading ore, drilling, haulage, and persons falling down chutes or other openings. In spite of the increase, however, the rate for metal mining in Michigan was decidedly favorable, being only about one-third as high as the average rate for the country as a whole.

Minnesota.—The mining industry of Minnesota led that of all other States by establishing the lowest injury rate for accidents to workers underground. The State's rate, although 40 percent higher than in 1935, was 77 percent lower than the average rate for underground operations in metal mines of the United States. The State's rate for virtually all classes of accidents compares favorably with the national average, but the increase in the average rate for 1936 compared with 1935 was due chiefly to accidents caused by loading ore at the face, handling materials other than rock or ore, and machinery.

Montana.—Injuries caused by accidents underground in mines in Montana resulted in a rate that was 21 percent higher than in 1935 and 28 percent higher than the national average for 1936. The increase in the State's rate was due to higher rates for accidents from haulage and falling rock or ore from the roof or wall.

Nevada.—Higher rates for haulage accidents, falls of rock or ore from the roof or wall, and handling materials caused a 35-percent rise in the injury rate for underground mining in Nevada in 1936. Notwithstanding the rise, however, the State's rate was only 9 percent higher than the average rate for the United States. In 1935 the rate for Nevada was 8 percent more favorable than the national average.

New Mexico.—The injury rate for underground work in metal mines in New Mexico increased 29 percent in 1936. The increase was attributable mainly to higher rates for accidents caused by haulage, falling rock or ore from the roof or wall, and loading ore at the working face. The rate for the State was 15 percent higher than the national average rate in 1936.

Oklahoma.—A reduction of nearly 9 percent was made in the injury rate for underground mining in Oklahoma in 1936. The improvement was particularly notable in the rates for accidents caused by drilling and by falls of persons down chutes or other openings underground. The Oklahoma rate for underground accidents was 24 percent lower or better than the average rate for the United States.

South Dakota.—The mines of South Dakota experienced a large increase, about 66 percent, in the rate for nonfatal injuries to underground workers in 1936. Higher rates were noted for accidents caused by haulage, handling materials, and miscellaneous causes underground. The injury rate for South Dakota mines was 24 percent lower or more favorable than the national average.

Utah.—The injury rate for underground accidents at mines in Utah was 26 percent higher than the average rate for the United States and 35 percent higher than the rate for the State in 1935. The increase in the State's rate in 1936 was due to accidents from several causes but chiefly from haulage and falls of rock or ore from the roof or wall.

Table 22 shows the injury rates for mines in the principal metal-mining States according to main causes of nonfatal injuries underground. The second part of the table gives similar information for nonfatal injuries due to accidents at open-pit mines.

ACCIDENTS CLASSIFIED BY MINING METHODS

The classification of mining methods used in this bulletin was originated by the Mining Division of the Bureau of Mines for use in the Division's studies of the relative efficiency of various mining methods from the standpoint of productivity and costs. The classification was first used in this series of statistical bulletins for accidents covering the calendar year 1929; it is as follows:

A. Underground methods:

1. Open stope, including the room-and-pillar method and sublevel stoping.
2. Shrinkage.
3. Cut-and-fill.
4. Square-set.
5. Block caving.
6. Sublevel caving.
7. Top slicing.

B. Surface methods:

8. Open-cut with power shovel.
9. Open-cut with power scraper.
10. Open-cut, hand loading only.
11. Hydrauliclicking.
12. Dredging.

From the standpoint of number of companies represented and number of men employed in the mines the most widely used operating method in metal and nonmetal mines employing 25 or more men is the open-stope method, including the room-and-pillar method and sublevel stoping.

In 1936 top slicing had the lowest combined accident-frequency rate for fatalities and injuries in underground mining. The next lowest accident rate was that for open stoping. The highest rate was reported by mines using square-set methods.

It should be made clear in this connection that a mining company is not free to choose any method of mining that officials may prefer or to adopt any method solely from the standpoint of safety. The method to be used is determined mainly by the type of deposit, the character and value of the ore, and the possibility of extracting the ore at an economically sound price.

Table 23 shows the number of employees in mines using each of the various methods and the comparative accident-frequency rates of these mines for fatalities and nonfatal lost-time injuries. Each mine is classified according to its principal mining method, as shown in the company report to the Bureau of Mines.

The figures for open-stope methods relate chiefly to the iron-ore mines of Alabama and Michigan and the lead-zinc mines of Kansas, Missouri, and Oklahoma. Shrinkage methods were reported mainly for gold and silver mines in some of the Western States. Cut-and-fill methods were shown for gold and silver mines in Idaho, California, and Colorado and for several copper mines in Arizona. Mining by square-set methods was reported chiefly by gold-silver-copper-lead-zinc mines in the Western States. The figures for block caving represent the experience of a few metal mines in Arizona, Colorado, and several other States. All figures for sublevel caving were reported by iron-ore mines in Michigan, Minnesota, and Wisconsin. The data for top slicing represent mainly the experience of iron-ore mines in Michigan and Minnesota and those for open-pit mining with power shovels the experience of iron-ore mines in Minnesota. Open-pit mining with hand loading shows the experience of several mines producing nonmetallic minerals chiefly in the Eastern States. The number and cause of accidents for each mining method are shown in tables 24, 25, and 26.

TABLE 23.—Metal-mine accident data, grouped by mining methods, during the year ended Dec. 31, 1936, for selected companies, with revised figures for 1935¹

1936

Method of mining	Number of mines	Number of States	Average days active	Man-days	Men employed	Man-hours of employment	Number killed	Number injured	Rate per million man-hours	
									Killed	Injured
Open stopes, including room-and-pillar and sublevel stoping.....	107	24	305	3,864,196	12,679	30,824,351	41	2,319	1.33	75.23
Shrinkage.....	32	12	303	678,797	2,241	5,428,352	9	811	1.66	149.40
Cut-and-fill.....	26	10	301	1,209,193	4,012	3,678,103	25	1,028	2.58	108.22
Square-set.....	39	11	284	1,540,018	5,419	12,223,380	37	2,052	3.05	166.34
Block caving.....	7	6	307	434,704	1,415	3,477,638	7	463	2.01	198.80
Sublevel caving.....	17	3	256	513,386	2,007	4,111,098	8	112	1.89	97.24
Top slicing.....	16	3	257	609,158	2,357	4,848,408	4	104	.85	21.83
Open-cut, with power shovel.....	16	3	257	609,158	2,357	4,848,408	4	104	.85	21.83
Open-cut, hand loading only.....	42	7	1,488,133	1,488,133	6,251	11,989,935	8	160	.67	13.34
Total.....	286	-----	284	10,335,085	36,381	82,581,185	139	7,019	1.08	85.36

1935

Open stopes, including room-and-pillar and sublevel stoping.....	137	25	229	2,700,612	11,776	21,284,963	29	1,645	1.36	77.28
Shrinkage.....	22	9	261	372,780	1,427	2,982,258	5	377	2.18	126.41
Cut-and-fill.....	25	9	201	879,572	3,021	7,043,572	15	732	1.40	103.82
Square-set.....	41	9	304	1,447,041	4,764	11,396,722	16	1,526	1.01	133.90
Block caving.....	7	6	210	258,477	1,231	2,068,210	4	4	1.93	156.66
Sublevel caving.....	16	5	224	370,876	1,654	2,973,007	3	75	1.01	25.23
Top slicing.....	20	4	231	591,952	2,562	4,735,627	2	96	.42	20.27
Open-cut, with power shovel.....	38	13	281	1,157,565	4,442	9,389,536	2	154	2.21	16.40
Open-cut, hand loading only.....	5	5	173	39,352	4,227	311,816	1	7	3.21	22.45
Total.....	311	-----	251	7,818,227	31,104	62,185,771	77	4,936	1.24	79.38

¹ Underground and open-cut only. No reports used for mines where less than 25 men were employed.

TABLE 24.—Injuries, classified by principal causes and mining methods, at metal mines, during the year ended Dec. 31, 1936, for selected companies¹

Method of mining	By falls of rock: 1 and 1			By run or fall of ore while loading: 2, 7, and 7			Explosives: 4 and 2			By haulage: 5 and 3			By falls of persons: 6 and 5			Miscellaneous: 3, 8, 9, 10, 11, 12, 13, 14, 15, 4, 6, 8, 9, 10, and 11			In shaft: 17, 18, 19, 20, 21, and 22			Total		
	Number	Percent of total	Rate per million man-hours	Number	Percent of total	Rate per million man-hours	Number	Percent of total	Rate per million man-hours	Number	Percent of total	Rate per million man-hours	Number	Percent of total	Rate per million man-hours	Number	Percent of total	Rate per million man-hours	Number	Percent of total	Rate per million man-hours			
																						Number	Percent of total	Rate per million man-hours
Open slope, including room-and-pillar and sublevel stoping.....	299	11.00	8.72	458	19.75	14.86	13	0.56	0.42	331	14.27	10.74	127	5.48	4.12	1,069	46.10	34.68	52	2.24	1.69	2,310	100.00	75.23
Shrinkage.....	123	15.17	22.66	103	12.70	18.97	6	.74	1.11	95	11.71	17.50	36	4.44	6.63	415	51.17	76.45	32	4.07	6.08	811	100.00	145.40
Cut-and-fill.....	252	22.37	23.97	104	10.12	10.73	10	.97	1.08	95	9.63	10.23	36	3.50	3.72	499	48.54	51.56	48	4.67	4.98	1,028	100.00	106.20
Square-set.....	451	22.15	36.90	158	7.78	12.93	2	.10	.16	198	8.74	16.20	100	3.32	8.18	1,069	52.01	57.46	54	2.66	4.42	2,063	100.00	166.24
Block caving.....	116	24.02	33.36	65	13.46	18.69	7	1.45	2.01	32	6.62	9.20	16	3.31	4.60	247	51.14	71.03	2	1.78	.49	463	100.00	128.69
Sublevel caving.....	31	27.68	7.54	4	3.57	.97	9	8.94	2.19	4	3.57	1.97	4	3.57	1.03	62	55.30	13.08	2	1.78	.49	112	100.00	27.24
Top slicing.....	23	22.12	4.74	12	11.54	2.48	10	9.61	2.06	5	4.81	1.03	5	4.81	1.03	31	49.04	10.52	---	---	---	104	100.00	21.49
Open-cut, with power shovel.....	22	13.75	1.83	2	1.25	.17	8	5.00	.67	18	11.25	1.50	19	11.88	1.93	91	56.87	7.38	---	---	---	160	100.00	13.34
Total.....	1,267	17.97	15.34	906	12.85	10.97	49	.70	.56	792	11.24	9.59	343	4.87	4.16	3,503	49.09	42.42	189	2.68	2.29	7,046	100.00	85.36

¹ Underground and open-cut only. No reports used for mines where less than 25 men were employed.

TABLE 25.—Fatalities, classified by principal causes and mining methods, at metal mines, during the year ended Dec. 31, 1936, for selected companies¹

Method of mining	By falls of rock: 1 and 1			By run or fall of ore while loading: 2, 7, and 7			Explosives: 4 and 2			By haulage: 5 and 3			By falls of persons: 6 and 5			Miscellaneous: 3, 8, 9, 10, 11, 12, 13, 14, 15, 16, 4, 6, 8, 9, 10, 11, and 12			In shaft: 17, 18, 19, 20, 21, and 22			Total			
	Numbers	Percent of total	Rate per million man-hours	Number	Percent of total	Rate per million man-hours	Number	Percent of total	Rate per million man-hours	Number	Percent of total	Rate per million man-hours	Number	Percent of total	Rate per million man-hours	Number	Percent of total	Rate per million man-hours	Number	Percent of total	Rate per million man-hours				
Open stope, including room-and-pillar and sublevel stoping	20	48.78	0.65				4	9.76	0.13	5	12.19	0.16	3	7.32	0.10	4	9.76	0.13	5	12.19	0.16	41	100.00	1.33	
Shrinkage	5	55.56	.92																						
Cut-and-fill	7	28.00	.72	3	12.00	.31	3	12.00	.31	1	4.00	.10	1	4.00	.10	7	28.00	.72	3	12.00	.31	25	100.00	2.58	
Square-set	9	24.32	.74				2	8.11	.25	1	2.70	.08	3	8.11	.25	7	18.92	.57	14	37.84	1.14	37	100.00	3.03	
Block caving	1	4.23	.90				2	28.57	.57	1	14.29	.29				2	28.57	.57	1	14.29	.29	7	100.00	2.01	
Sublevel caving	5	62.50	1.22	1	12.50	.24	3	75.00	.62				1	12.50	.24	1	12.50	.24	1	12.50	.24	8	100.00	1.95	
Top slicing	1	12.50	.08							5	62.50	.42	1	12.50	.08	1	25.00	.21	1	25.00	.21	8	100.00	.83	
Open-cut, with power shovel										13	9.35	.16	9	6.47	.11	23	16.55	.28	27	19.43	.32	139	100.00	1.88	
Total	48	34.53	.58	4	2.88	.05	15	10.79	.18	13	9.35	.16	9	6.47	.11	23	16.55	.28	27	19.43	.32	139	100.00	1.88	

¹ Underground and open-cut only. No reports used for mines where less than 25 men were employed.

TABLE 26.—Accidents in 1936, by causes and mining methods, for selected companies

	Underground										Shaft														
	Fall of rock or ore from roof or wall	Rock or ore while loading at working face	Hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of ore from chute or pocket	Drilling	Electricity	Machinery	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling material (other than rock or ore)	Other causes	Total, underground	Falling down shaft	Objects falling down shaft	Breaking of cables	Overwinding	Skip, cage, or bucket	Other causes	Total, shaft	
Killed:																									
Open stope, including room-and-pillar and sublevel stoping	20			4	5	3			1						1	2	36	2	2			1			5
Shrinkage	7			3	1	1	3		1						4	2	22	1	1	10		3			3
Cut-and-fill	9			2	1	3						7			1	1	23	3				1			3
Square-set	1			2	1										1	1	6								14
Block caving	5			3			1								1	1	7								1
Sublevel caving				3											1	1	4								1
Top slicing				15	8	8	4		2			7			7	6	104	6	3	10		8			27
Total	47			41	774	324	351	758	18	184	1	16	1	101	682	1,104	6,700	18	43	2	1	52	73	189	
Injured:																									
Open stope, including room-and-pillar and sublevel stoping	269	308	105	13	331	127	150	320	9	80		7		25	148	375	2,267	3	7		1	20	21	52	
Shrinkage	123	39	48	6	95	36	64	156	2	29	1	1	18	70	70	90	778	9	16		8	9	22	33	
Cut-and-fill	232	61	85	10	99	36	43	109	3	24		7	22	107	142	142	980	3	13	1		15	28	54	
Square-set	451	118	230	2	198	100	40	131	24	11		2	29	282	371	1,978	3	7	1						
Block caving	116	15	56	7	32	16	50	28	4	11			6	44	98	483									
Sublevel caving	31	2	14	2	9	4	2	5		9			1	17	16	110								2	
Top slicing	23	10	9	3	10	5	2	9		7			1	14	12	104									
Total	1,245	553	547	41	774	324	351	758	18	184	1	16	1	101	682	1,104	6,700	18	43	2	1	52	73	189	

PLACER MINES

Reports covering placer mining in 1936 covered properties at which 10,393 men were employed for an average of 174 days per man. The total working time for all employees was slightly in excess of 1.8 million man-shifts or approximately 14.5 million man-hours, as shown in table 27. The fatality rate due to accidents of 0.76 in 1936 did not differ greatly from the rate reported of 0.72 in 1935. Accidents causing nonfatal injuries resulted in a rate of 35.03 per million man-hours of employment compared with 41.63 in 1935, a difference of 16 percent in favor of 1936. Most of the men were engaged in surface work (4,441 men at placer operations, 1,423 men at hydraulic operations and 3,557 at dredging operations), but 972 men worked underground. Accidents resulted in 11 fatalities and 507 nonfatal injuries. (See tables 27, 28, and 29.)

It has never been practicable for the Bureau of Mines to obtain complete reports from all placer mines in the United States. The collection of reports is difficult owing to the short period of operation at many prospects and mines employing 1 or 2 men and the impossibility of learning the names and addresses of all individuals and companies doing small amounts of work in out-of-the-way places. The figures given in this bulletin, insofar as they relate to placers, reveal accident rates that are probably lower than they would be if complete reports covering all properties could be obtained. The data are included to show the rates with as much accuracy as possible, but the degree of accuracy is considerably short of what is desired.

TABLE 27.—Placer mines: Men employed, man-days of employment, and number killed and injured during the year ended Dec. 31, 1936

	Under-ground	Surface	Dredging	Hydrau-licking	Total
Men employed.....	972	4,441	3,557	1,423	10,393
Man-days.....	174,739	481,229	922,414	229,212	1,807,594
Average days active.....	180	108	259	161	174
Man-hours of employment.....	1,376,531	3,884,565	7,368,355	1,843,140	14,472,591
Number killed.....	4	4	4	3	11
Number injured.....	107	97	263	40	507
Killed per million man-hours.....	2.91	0.54	0.54	1.63	0.76
Injured per million man-hours.....	77.73	24.97	35.69	21.70	35.03

TABLE 28.—Placer mines: Severity of injury during the years ended Dec. 31, 1935 and 1936

	1935						1936					
	Killed	Perma-nent total disa-bility	Perma-nent partial disa-bility	Tempo-rary	Total non-fatal	Grand total	Killed	Perma-nent total disa-bility	Perma-nent partial disa-bility	Tempo-rary	Total non-fatal	Grand total
Underground.....	8	3	151	154	162	4	1	106	107	111		
Surface.....	3	148	151	151	151	4	3	97	97	97		
Dredging.....	1	7	234	241	242	4	3	260	263	267		
Hydraulicking.....	2	1	90	91	93	3	40	40	40	43		
Total.....	11	14	623	637	648	11	4	503	507	518		

TABLE 29.—Placer mines: Number killed and injured, by causes, during the years ended Dec. 31, 1935 and 1936

Cause	1935		1936	
	Killed	Injured	Killed	Injured
Underground:				
1. Fall of rock or ore from roof or wall.....	5	34	1	13
2. Rock or ore while loading at working face.....		19		32
3. Hand tools.....		15		12
4. Explosives.....	3	1	2	
5. Haulage.....		24		13
6. Falling down chute, winze, raise, or stope.....		18		2
7. Run of ore from chute or pocket.....		1		2
8. Drilling.....		8		8
9. Electricity.....		1		
10. Machinery (other than locomotives or drills).....		5		3
11. Mine fires.....				
12. Suffocation from natural gases.....		2		
13. Inrush of water.....		1		
14. Stepping on nail.....		4		2
15. Handling materials (other than rock or ore).....		11		9
16. Other causes.....		6		9
Total, underground.....	8	150	3	105
Shaft:				
17. Falling down shaft.....		1	1	
18. Objects falling down shaft.....				1
19. Breaking of cables.....				
20. Overwinding.....				
21. Skip, cage, or bucket.....		3		1
22. Other causes.....				
Total, shaft.....		4	1	2
Surface:				
1. Mine cars, mine locomotives, gravity or aerial trams.....		5		
2. Railway cars and locomotives.....		1		1
3. Run or fall of ore in or from ore bins.....		2		1
4. Falls of persons.....		27		18
5. Stepping on nail.....		9		5
6. Hand tools.....		16		9
7. Electricity.....		2		1
8. Machinery.....		13		14
9. Handling materials.....		17		6
10. Other causes.....		59		42
Total, surface.....		151		97
Dredging:				
1. Machinery.....		37	1	55
2. Electricity.....		3		6
3. Boiler explosions or bursting steam pipes.....		1		
4. Falls of persons.....		38	1	53
5. Hand tools.....		32		26
6. Handling materials.....		59		48
7. Other causes.....	1	71	2	75
Total, dredging.....	1	241	4	263
Hydrauliclicking:				
1. Cave of bank.....	2	8	2	3
2. Explosives.....				
3. Hydraulic giants.....		5	1	2
4. Falls of persons.....		19		9
5. Rock while handling.....		4		1
6. Hand tools.....		15		9
7. Machinery, derricks, etc.....		10		1
8. Handling materials (other than rock or ore).....		18		8
9. Other causes.....		12		7
Total, hydrauliclicking.....	2	91	3	40
Grand total, 1936.....	11	637	11	507

MINES OPERATED WITHOUT FATAL ACCIDENTS

All of the 199 fatal accidents at metal and nonmetal mines in 1936 occurred at 129 mines. Reports from operating companies revealed that 8,322 individual mines were operated during the year without a fatal accident. Mines without fatal accidents accounted for 75 percent of the total number of men employed in mining metallic and nonmetallic minerals in the United States and for 70 percent of the total number of man-hours worked in the entire industry. The 129 mines at which 199 men were killed by accidents were much larger, on the average, than were the mines that had no fatalities; they averaged 195 men per mine compared with 9 men per mine for the fatality-free properties. The fatality rate of mines having fatal accidents was 3.30 per million man-hours of employment compared with 0.98 for the industry as a whole. Their nonfatal-injury rate was 88.09, compared with 65.73 for mines that had no fatalities and 72.40 for the entire industry. (See table 30.)

The States which had no fatal accidents at metal and nonmetal mines during 1936 are shown in tables 31 and 32. Of the States which had fatal accidents, California reported the highest percentage of its mine employees working in mines that operated without a fatality; 95 percent of its mine workers were employed in fatality-free mines. Tables 31 and 32 show the relative standing of the States according to percentage of mine workers and man-hours accounted for by mines that had no fatal accidents.

TABLE 30.—Comparative fatal and nonfatal accident data for metal and nonmetal mines (other than coal mines) in the United States in 1936

	Mines that had no fatal accidents	Mines that had fatal accidents	All metal and non-metal mines
Number of mines.....	8,322	129	8,451
Number of employees.....	75,737	25,195	100,932
Proportion of total employees..... percent	75.0	25.0	100.0
Number of employees per mine.....	9	195	12
Man-days of employment.....	17,668,479	7,541,426	25,209,905
Average worked per man..... days	233	299	250
Man-hours of employment.....	142,043,489	60,315,236	202,358,725
Average worked per man..... hours	1,875	2,394	2,005
Number of men killed.....	-----	199	199
Number of men injured.....	9,337	5,313	14,650
Death rate per million man-hours.....	-----	3.30	0.98
Injury rate per million man-hours.....	65.73	88.09	72.40

TABLE 31.—Metal and nonmetal mines (other than coal mines): Number of men employed in 1936

State	At mines that had fatalities	At mines that had no fatalities	Employees represented by mines that had no fatalities (percent)	State	At mines that had fatalities	At mines that had no fatalities	Employees represented by mines that had no fatalities (percent)
Texas.....		1,652	100.0	Oklahoma.....	172	2,395	93.3
Oregon.....		1,247	100.0	Washington.....	53	721	93.2
Florida.....		1,109	100.0	Tennessee.....	164	1,660	91.0
Virginia.....		891	100.0	Kansas.....	134	1,168	89.7
Kentucky.....		847	100.0	Nevada.....	546	3,887	87.7
Wisconsin.....		803	100.0	Alaska.....	612	3,430	84.9
New Jersey.....		761	100.0	Minnesota.....	1,364	6,366	82.4
North Carolina.....		674	100.0	New Mexico.....	434	1,830	80.8
Louisiana.....		522	100.0	Illinois.....	122	394	76.4
Wyoming.....		383	100.0	United States.....	25,195	75,737	75.0
Pennsylvania.....		273	100.0	Colorado.....	1,857	4,404	70.3
Vermont.....		145	100.0	Montana.....	3,015	6,600	68.6
New Hampshire.....		135	100.0	Arizona.....	3,103	4,904	61.2
Iowa.....		120	100.0	Michigan.....	2,909	4,442	60.4
Maine.....		119	100.0	Idaho.....	2,062	2,893	58.4
Ohio.....		111	100.0	Missouri.....	1,056	1,086	50.7
South Carolina.....		99	100.0	New York.....	782	787	50.2
Other States ¹		72	100.0	Utah.....	2,532	2,491	49.6
Connecticut.....		58	100.0	Alabama.....	1,955	1,800	47.9
California.....	676	12,988	95.1	South Dakota.....	1,588	370	18.9
Georgia.....	28	537	95.0				
Arkansas.....	31	563	94.8				

¹ Includes Indiana, Maryland, Massachusetts, Nebraska, and West Virginia.

TABLE 32.—Metal and nonmetal mines (other than coal mines): Number of man-hours worked in 1936

State	At mines that had fatalities	At mines that had no fatalities	Man-hours represented by mines that had no fatalities (percent)	State	At mines that had fatalities	At mines that had no fatalities	Man-hours represented by mines that had no fatalities (percent)
Texas.....		3,937,549	100.0	Tennessee.....	384,416	3,688,120	90.6
Florida.....		2,407,930	100.0	Washington.....	141,798	1,031,404	87.9
Oregon.....		1,957,159	100.0	Kansas.....	292,464	2,094,688	87.7
Virginia.....		1,707,593	100.0	Georgia.....	98,000	576,251	85.5
Kentucky.....		1,457,189	100.0	Nevada.....	1,473,108	7,274,422	83.2
New Jersey.....		1,418,267	100.0	Minnesota.....	2,723,955	10,898,121	80.0
Wisconsin.....		1,409,267	100.0	New Mexico.....	1,092,319	4,029,732	78.7
Louisiana.....		1,271,799	100.0	Alaska.....	1,747,088	5,336,576	75.3
North Carolina.....		1,148,811	100.0	Illinois.....	304,180	836,198	73.3
Pennsylvania.....		623,159	100.0	United States.....	60,315,236	142,043,489	70.2
Wyoming.....		505,627	100.0	Montana.....	7,249,121	12,832,437	63.9
New Hampshire.....		259,385	100.0	Colorado.....	4,653,875	7,166,867	60.6
Vermont.....		246,784	100.0	Michigan.....	6,723,783	9,052,919	57.4
South Carolina.....		222,470	100.0	Idaho.....	4,770,464	4,619,059	49.2
Iowa.....		194,603	100.0	Alabama.....	3,513,675	3,323,681	48.6
Maine.....		180,747	100.0	Arizona.....	8,492,861	7,807,769	47.9
Ohio.....		133,208	100.0	New York.....	1,834,978	1,547,022	45.7
Other States ¹		127,604	100.0	Missouri.....	2,178,208	1,723,218	44.2
Connecticut.....		97,752	100.0	Utah.....	6,327,008	4,685,683	42.5
California.....	1,598,613	28,447,739	94.7	South Dakota.....	4,233,137	711,364	14.4
Arkansas.....	73,904	916,803	92.5				
Oklahoma.....	408,281	4,136,513	91.0				

¹ Includes Indiana, Maryland, Massachusetts, Nebraska, and West Virginia.

SUMMARY TABLES

Table 33 summarizes the number of accidents and the accident rates in mines producing metallic ores and nonmetallic minerals, other than coal, sand, gravel, and clay, for 1936 and previous years, according to the severity of the accident, that is, whether it resulted in the death of the injured worker or in permanent total, permanent partial, or temporary disability for longer than the day on which the accident occurred.

Table 34 summarizes statistical data covering the number of employees and the number of accidents in and about the metal and non-metal mines of the United States for the 26-year period 1911-36. The accident rates shown in the table have been computed on a basis of 1,000 men working 300 days each year. The rates are shown on a 300-day basis because reports of the number of man-hours worked at the mines were not collected for the full period covered by the table. The accident rates in table 35 have been broken down into the five broad classes of mining.

Table 36 shows the number of men working, the number of accidents, and the accident rates per million man-hours of exposure for most of the mining and metallurgical industries of the United States during the calendar year 1936. The table does not cover iron blast furnaces, sand, gravel, and clay pits, or oil and gas wells, as Nation-wide accident data for these industries have not been collected by the Bureau of Mines. The rates in the last two columns of the table show the comparative frequency of fatal and nonfatal accidents in the various branches of the mineral industry for 1936. The table shows that byproduct coke ovens had the lowest injury rate and anthracite mines the highest injury rate.

TABLE 33.—All mines: Number of fatalities and injuries and fatality and injury rates per thousand 300-day workers, classified by severity of injury, 1927-36

NUMBER OF ACCIDENTS							
Severity of injury	Total 1927-31	1932	1933	1934	1935	1936	Total 1932-36
Fatal.....	1,404	107	95	116	164	199	681
Permanent total ¹	89	10	5	2	7	5	29
Permanent partial ²	2,295	167	127	191	246	290	1,021
Temporary ³	92,623	4,837	5,793	7,699	9,953	14,355	42,637
Total.....	96,411	5,121	6,020	8,008	10,370	14,849	44,368

RATES PER THOUSAND 300-DAY WORKERS							
Fatal.....	2.85	2.89	2.45	2.36	2.42	2.37	2.46
Permanent total ¹18	.27	.13	.04	.10	.06	.10
Permanent partial ²	4.65	4.52	3.27	3.89	3.63	3.45	3.69
Temporary ³	187.69	130.79	149.28	156.88	146.71	170.82	154.07
Total.....	195.37	138.47	155.13	163.17	152.86	176.70	160.32
Average number of 300-day workers per year.....	493,491	36,984	38,807	49,077	67,841	84,033	276,743

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, arm, 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 34.—Number of men employed, man-days of employment, and number of men killed and injured at all mines (except coal mines) in the United States, 1911–36

Year	Average days active	Men employed		Total shifts	Number killed		Number injured	
		Actual number	Equivalent in 300-day workers (calculated)		Total	Per thousand 300-day workers (calculated)	Total	Per thousand 300-day workers (calculated)
1911.....	282	165,979	156,083	46,826,573	695	4.45	26,577	170.27
1912.....	287	168,550	161,059	48,317,800	661	4.10	30,734	190.82
1913.....	288	191,276	183,594	55,077,855	683	3.72	32,971	179.69
1914.....	271	158,115	142,620	42,785,840	559	3.92	30,216	211.87
1915.....	280	152,118	141,997	42,599,015	553	3.89	35,295	243.56
Average for 5 years...	282	167,208	157,072	47,121,417	630	4.01	31,159	198.37
1916.....	282	204,685	192,455	57,736,425	697	3.62	48,237	250.64
1917.....	287	200,579	192,085	57,625,811	852	4.44	46,286	240.97
1918.....	297	182,606	181,006	54,301,748	646	3.57	42,915	237.09
1919.....	279	145,262	134,871	40,461,350	468	3.47	31,506	233.60
1920.....	296	136,583	134,540	40,361,893	425	3.16	32,562	242.02
Average for 5 years...	288	173,943	166,991	50,097,445	618	3.70	40,301	241.34
Average for 10 years...	285	170,576	162,031	48,609,431	624	3.85	35,730	220.51
1921.....	238	93,929	74,509	22,352,702	230	3.09	18,604	249.69
1922.....	276	105,697	97,138	29,141,293	344	3.54	26,080	268.48
1923.....	297	123,279	121,866	36,559,805	367	3.01	33,563	275.41
1924.....	290	123,128	119,113	35,734,008	418	3.51	33,118	278.04
1925.....	293	126,713	123,908	37,172,359	371	2.99	35,132	283.53
Average for 5 years...	281	114,549	107,307	32,192,033	346	3.23	29,299	273.04
Average for 15 years...	284	151,933	143,790	43,136,965	531	3.69	33,586	233.58
1926.....	291	127,823	123,870	37,160,978	430	3.47	30,350	245.01
1927.....	284	119,699	113,447	34,003,963	352	3.10	25,133	221.54
1928.....	288	113,866	109,345	32,803,610	273	2.50	22,483	205.61
1929.....	292	118,735	115,394	34,618,120	350	3.03	23,092	200.11
1930.....	270	103,233	92,900	27,869,982	271	2.92	15,594	167.86
Average for 5 years...	285	116,671	110,991	33,297,330	335	3.02	23,330	210.20
Average for 20 years...	284	143,093	135,590	40,677,056	482	3.55	31,022	228.79
1931.....	231	80,940	62,405	18,721,486	158	2.53	8,709	139.56
1932.....	208	53,288	36,984	11,095,167	107	2.89	5,014	135.57
1933.....	204	57,016	38,807	11,642,113	95	2.45	5,925	152.68
1934.....	221	66,645	49,077	14,723,215	116	2.36	7,892	160.81
1935.....	220	92,314	67,841	20,352,372	164	2.42	10,206	150.44
Average for 5 years...	219	70,041	51,023	15,306,871	128	2.51	7,549	147.95
Average for 25 years...	271	128,482	118,677	36,603,019	411	3.46	26,328	221.85
1936.....	250	100,932	84,033	25,209,905	199	2.37	14,650	174.34

TABLE 35.—United States metal and nonmetallic mineral mines: Accident rates per thousand 300-day workers, 1911–36

Year	Copper		Gold, silver, miscellaneous		Iron		Lead and zinc (Mississippi Valley)		Nonmetallic mineral		Total	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
1911.....	5.18	225.3	4.28	80.3	4.64	252.3	4.03	139.4	2.01	34.0	4.45	170.3
1912.....	4.53	258.4	4.32	93.0	3.96	241.8	4.28	158.3	1.66	66.4	4.09	190.1
1913.....	4.08	230.8	3.83	70.4	3.29	268.3	3.90	133.5	3.02	84.9	3.72	179.6
1914.....	3.85	312.2	4.06	126.9	3.78	224.1	4.32	189.0	3.73	99.9	3.92	211.9
1915.....	3.72	322.0	4.79	201.5	2.88	233.5	5.37	238.3	2.43	107.8	3.89	248.6
1916.....	3.64	319.6	4.05	190.8	3.41	240.2	3.14	263.1	3.00	144.7	3.62	250.6
1917.....	5.88	313.4	4.03	172.5	3.54	227.5	4.09	273.0	2.48	123.6	4.44	241.0
1918.....	3.45	322.1	4.27	185.2	3.45	185.5	3.58	319.5	1.67	104.7	3.57	237.1
1919.....	3.54	309.6	4.41	191.3	3.09	202.4	4.13	292.3	1.65	139.3	3.47	233.6
1920.....	3.43	323.2	4.20	204.8	2.34	200.5	3.27	328.0	2.89	161.9	3.16	242.0
1921.....	3.70	317.5	3.29	225.5	3.04	210.9	2.58	379.7	1.98	215.5	3.09	249.7
1922.....	3.00	320.8	5.35	260.3	3.00	177.4	2.64	464.2	2.39	247.5	3.54	268.5
1923.....	3.11	349.1	3.93	298.9	2.38	150.2	2.73	495.7	2.67	212.5	3.01	275.4
1924.....	3.55	347.8	4.99	297.8	2.95	151.0	2.76	464.2	1.94	178.7	3.51	278.0
1925.....	2.94	350.6	3.83	307.4	2.54	159.4	3.32	468.1	1.71	165.4	2.99	283.5
1926.....	3.45	288.3	3.27	299.5	4.23	133.9	3.05	304.2	2.62	190.7	3.47	245.0
1927.....	3.46	261.2	3.91	279.8	2.45	114.6	2.64	297.7	2.19	171.2	3.10	221.5
1928.....	3.03	221.0	2.60	268.7	2.16	98.1	1.62	295.7	2.13	168.6	2.50	205.6
1929.....	3.03	223.8	3.66	269.4	2.08	89.6	2.08	238.3	2.29	168.1	3.03	200.1
1930.....	2.76	193.5	4.49	239.7	2.68	81.4	1.63	176.6	.75	138.3	2.92	167.9
1931.....	3.01	152.5	2.88	190.0	1.91	52.7	2.56	176.6	1.63	124.3	2.53	139.6
1932.....	3.01	112.5	3.66	179.3	1.68	44.6	3.95	164.8	1.56	117.6	2.89	135.6
1933.....	2.49	130.3	3.20	204.0	1.42	50.6	.85	147.6	1.39	129.3	2.45	152.7
1934.....	1.96	109.0	3.33	229.5	1.79	48.3	.91	196.1	1.23	121.3	2.36	160.8
1935.....	2.05	157.8	2.86	182.7	2.15	42.9	2.26	166.0	1.01	116.9	2.42	150.4
1936.....	2.62	194.2	2.70	224.8	2.01	60.3	3.33	135.5	.45	116.5	2.37	174.3

TABLE 36.—*Accident data, including rates for different branches of mineral industries in 1936*

Industry	Average days active	Men employed	Man-days	Man-hours	Weighted average length of shift	Man-hours per man per year	Killed	Injured	Number killed or injured per million man-hours	
									Killed	Injured
1. Coal mines.....	197	584,582	114,891,493	826,386,460	7.19	1,414	1,342	69,576	1.62	84.19
Bituminous.....	197	482,082	95,261,754	669,900,536	7.03	1,388	1,098	50,514	1.639	75.41
Anthracite.....	192	102,082	19,629,739	156,485,924	7.97	244	244	19,062	1.559	121.81
2. All metal mines.....	250	100,932	25,209,905	202,358,725	8.03	2,475	199	14,650	0.98	72.40
Copper.....	309	14,102	4,354,689	34,940,267	8.03	2,475	38	2,819	1.09	80.77
Gold, silver, and miscellaneous metal.....	241	51,162	12,316,194	98,886,507	8.03	1,933	111	9,227	1.12	98.31
Iron.....	232	18,696	4,317,877	34,692,621	8.03	1,866	29	868	0.84	25.02
Lead and zinc (Mississippi Valley).....	220	6,688	1,532,497	12,323,443	8.04	2,077	4	692	1.38	56.15
Nonmetallic mineral.....	256	10,380	2,688,648	21,555,867	8.02	2,077	4	1,044	1.19	46.43
3. All quarries.....	272	26,004	7,066,607	51,808,453	7.79	1,838	91	5,717	0.62	38.87
Cement rock.....	224	8,243	1,844,713	14,703,473	7.33	1,992	23	763	0.44	14.05
Granite.....	194	24,288	4,706,595	38,352,985	8.15	1,579	34	2,075	0.89	51.89
Limestone.....	281	9,385	2,632,508	20,650,876	8.09	2,200	12	1,118	0.58	54.10
Limestone (chief product lime).....	231	3,304	898,722	6,701,620	8.22	1,655	1	250	0.30	37.30
Marble.....	203	2,192	628,568	5,166,628	8.09	1,655	1	248	0.19	48.00
Sandstone.....	228	2,165	586,022	4,899,820	8.34	1,906	1	254	1.23	51.94
Slate.....	187	3,637	580,480	4,700,593	8.25	1,540	6	281	1.67	58.66
Traprock.....	210	44,385	7,494,604	56,756,364	7.97	1,677	53	3,534	0.89	59.14
In and about quarry.....	236	44,385	11,370,650	87,308,084	7.67	1,967	38	2,183	0.44	25.00
In outside works.....	309	1,167	12,727,974	101,218,296	7.95	2,459	32	2,240	0.32	22.13
4. Metallurgical plants.....	263	13,003	2,413,824	27,565,082	8.08	2,120	18	800	0.65	29.02
Ore-dressing plants.....	340	16,100	3,453,844	43,267,185	7.88	2,677	5	558	0.21	20.39
Smelters.....	318	12,004	3,322,608	30,300,020	7.95	2,532	9	558	0.16	18.36
Auxiliary works.....	349	17,811	6,217,468	49,316,100	7.93	2,769	22	461	0.95	35.35
5. All coke ovens.....	183	1,525	1,279,866	10,042,072	6.95	1,273	1	69	0.51	8.27
Beehive.....	365	16,286	5,937,922	47,877,025	7.98	2,909	21	392	0.44	8.27
Total.....	216	824,514	177,920,334	1,326,847,029	7.45	1,609	1,686	92,643	1.27	69.85

After this publication has served your purpose and if you have no further need for it, please return it to the Bureau of Mines. The use of this mailing label to do so will be official business, and no postage stamps will be required

**UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES**

**PENALTY FOR PRIVATE USE TO AVOID
PAYMENT OF POSTAGE, \$300**

**OFFICIAL BUSINESS
RETURN PENALTY LABEL**

This label can be used only for returning official publications. The address must not be changed.

**BUREAU OF MINES,
WASHINGTON, D. C.**

