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METAL-MINE ACCIDENTS

IN THE

UNITED STATES

DURING THE CALENDAR YEAR 1930

BY

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METAL-MINE ACCIDENTS IN THE UNITED STATES DURING THE CALENDAR YEAR 1930 [1] [2]

By WILLIAM W. ADAMS [3]

INTRODUCTION

Although 1930 was a year of unsettled conditions and part-time operation in mining as in other industries (a situation that often tends toward greater accident hazards and rising accident rates in industry), the safety record in metal mining during the year was the best ever known by that industry. The average period during which the mines were in operation was considerably shorter than in 1929, a fact normally portending lower morale and more accidents in proportion to the number of men employed, yet the death rate from accidents at the mines was lower than in any year except 1928; and the injury rate, covering all accidents causing loss of time, was lower than ever before.

Companies operating metal mines deserve high praise for the splendid progress made in 1930 under prevailing conditions.

Reports from mine operators to the United States Bureau of Mines showed a falling off in the average number of men employed and in the number of man-shifts of work performed, as was to be expected. It was also natural that the average employee should have fewer days of work than in the preceding year. The gratifying feature of the year's work, however, was the reduction in the number of accidents, a reduction that was proportionately greater than the reduction in the number of men employed. Thus, for any given volume of employment or exposure to occupational hazards, the frequency of accidents in 1930 indicated marked improvement over that in 1929.

The accident-frequency rate for nonfatal injuries of a temporary nature—those that did not involve amputations or the permanent disabling of any part of the body—was much smaller than in 1929. These temporary injuries cover all cases involving disability to an employee lasting beyond the day on which the accident occurred. The fatality rate was also reduced, as previously stated. These two classes of accidents, fatalities and temporary nonfatal injuries, comprised 97 out of every hundred accidents that occurred during the year. The remaining 3 per cent of the accidents resulted in injuries of a permanent nature and caused either partial or complete disability of the injured employees. The frequency rate for injuries causing permanent disability increased.

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[1] Work on manuscript completed February, 1932.

[2] The statistical canvass of the metal-mining industry and the work incident to the preparation of the statistical tables in this publication were conducted by Miss Mary Bringhurst, assisted by Mrs. M. E. Kolhos, of the Bureau of Mines.

[3] Chief statistician, demographical division, U. S. Bureau of Mines.

Considering all mines covered by this publication, without reference to the kind of mineral produced, the operators' reports revealed lower fatality rates for opencut mining and for work at surface shops and yards and a slightly higher fatality rate for underground mining. The accident rate for nonfatal injuries was lower, however, for all three classes of work. (See Tables 1, 2, and 5.)

Mining as a whole, excluding coal mines and stone quarries, employed 103,233 men during the calendar year 1930. This number represents the summation of the "average" number of men employed at all mines in the United States as reported by the individual mines for the various periods during which they were in operation. As the period of operation of the individual mines ranged from a few days or weeks to the full 365 days in the year, the total number of employees as reported by the mines has been converted to its equivalent number of full-time or 300-day workers as a basis for calculating accident-frequency rates that may be compared for different years, for different branches of mining, or for different States. Men employed at the mines performed 27,869,982 man-days of labor in 1930, an amount equal to that which might be performed by 92,900 men if every man were employed 300 days during the year. The accident rate per thousand employees, when converted to a 300-day basis, was 2.92 for fatal and 167.86 for nonfatal injuries. Each of these rates, as already stated represents progress in the prevention of accidents over the previous year. Comparative figures for 1929 showed a fatality rate of 3.03 and an injury rate of 200.11.

The actual number of employees killed by mine accidents in 1930 was 271, and the number injured was 15,594. As shown in Tables 12 and 13, the outstanding causes of fatal accidents in underground mining operations were falls of rock or ore from the roof or wall; explosives; persons falling down chutes, winzes, raises, or stopes; and haulage. The chief causes of fatalities in stripping or opencut mining were explosives and falls or slides of rock or ore. Ten men were killed in opencut mining, 200 in underground operations, 37 in shaft accidents, and 24 in accidents that occurred in or about surface shops and yards connected with the mines. These figures do not include accidents to employees at ore-dressing or smelting plants, as such accidents are treated in a separate annual publication issued by the bureau and entitled "Accidents at Metallurgical Works." The fatality rates for underground, opencut, and surface work at the mines are shown in Table 5, which also gives the accident rates for nonfatal injuries. The chief causes of nonfatal injuries in underground mining, as shown in Table 13, were falls of rock or ore from the roof or wall, loading ore at the face, haulage, hand tools, and drilling. Similar injuries to workers in opencut mines were caused chiefly by handling materials, haulage, falls of persons, and falling or sliding rock or ore.

Tables 1 to 13 present the principal significant figures relating to accidents and employment in the metal-mining industry in 1930, and Tables 12 and 13 show the number and causes of fatal and nonfatal injuries in each State.

Operations at metal and nonmetal mines covered by this publication were conducted in 42 States during 1930. Michigan employed more men than any other State, with Minnesota and Arizona ranking second and third, respectively. In 24 States the industry employed 1,000 or more men; and among these States Florida ranked first with the

lowest death rate from accidents, having no fatalities at all during 1930 and having more men employed than Kentucky, which also had no fatalities. Minnesota ranked first with the smallest accident rate for nonfatal injuries. The relative standing of States having 1,000 or more mine workers is indicated below, arranged according to the number of men employed; the relative standing of the States is also shown arranged according to their fatal and nonfatal injury rates.

Relative standing of States having 1,000 or more men employed at mines, classified according to number of men employed, and fatality and injury rates per 1,000 men employed (300-day basis)

Relative standing	State	Number of men employed	Relative standing	State	Fatality rates	Relative standing	State	Injury rates
1	Michigan	16,410	1	Florida		1	Minnesota	60.59
2	Minnesota	11,762	2	Kentucky		2	Wisconsin	64.95
3	Arizona	10,162	3	Oklahoma	0.51	3	Alabama	65.37
4	Montana	6,491	4	Texas	.89	4	Florida	72.61
5	California	5,941	5	Virginia	1.02	5	Tennessee	80.02
6	Utah	5,352	6	Kansas	1.46	6	Kentucky	125.76
7	Alabama	4,966	7	Missouri	1.69	7	Texas	125.84
8	Idaho	4,412	8	Wisconsin	1.91	8	Alaska	135.86
9	Oklahoma	3,357	9	Arizona	2.06	9	Michigan	139.39
10	Alaska	3,241	10	New Mexico	2.15	10	Arizona	142.30
11	Colorado	3,233	11	Alaska	2.21	11	Virginia	149.13
12	Nevada	2,965	12	Minnesota	2.41	12	Missouri	172.03
13	Missouri	2,567	13	Utah	2.87	13	New Jersey	184.54
14	New York	2,334	14	Michigan	3.02	14	Nevada	187.17
15	New Mexico	2,217	15	Alabama	3.06	15	Kansas	200.00
16	Texas	2,019	16	Nevada	3.15	16	South Dakota	207.08
17	Kansas	1,957	17	Montana	3.80	17	Colorado	230.77
18	Tennessee	1,769	18	New York	3.80	18	New Mexico	236.43
19	South Dakota	1,676	19	Tennessee	4.03	19	Montana	236.50
20	Florida	1,565	20	New Jersey	4.16	20	Oklahoma	236.76
21	New Jersey	1,400	21	South Dakota	4.20	21	Utah	266.31
22	Virginia	1,182	22	Idaho	4.93	22	Idaho	240.39
23	Wisconsin	1,154	23	Colorado	5.27	23	California	284.36
24	Kentucky	1,082	24	California	5.84	24	New York	349.33

The foregoing fatality and injury rates indicate the number of deaths or injuries per thousand men employed (including surface workers), adjusted to a standard basis of 300 workdays.

Obviously, these accident rates do not indicate the reasons that underlie the favorable or unfavorable position of a State. Safety laws governing mines are more advanced in some States than in others, and enforcement of such laws is not equally effective in all States. Moreover, some mining companies pay more attention to accident prevention than do other companies; and the inherent hazards of mining are not equal in all States. Regarding the last-named factor, for example, opencut mining is attended with less danger than mining work underground, and this fact contributes toward a favorable accident experience in States where a large proportion of mining is conducted by opencut methods. In Minnesota opencut mining as compared with underground mining has relatively more importance than in other States. It should be emphasized, however, that the method of mining is only one factor in the equation; another very important factor is the amount of attention given to safety by individual mining companies, and in this connection is should be stated that many of the companies in Minnesota are among the most advanced leaders in mine-safety work in the United States.

TABLE 1.—*Accidents and accident-frequency rates at metal and nonmetallic mineral mines*

Character of disability	Number of accidents					Rates per thousand 300-day workers				
	1926	1927	1928	1929	1930	1926	1927	1928	1929	1930
Fatal	430	352	273	350	271	3.47	3.10	2.50	3.03	2.92
Permanent total [1]	20	11	19	22	22	.16	.09	.17	.19	.24
Permanent partial [2]	557	517	550	455	481	4.49	4.56	5.03	3.94	5.18
Temporary [3]	29,773	24,605	21,914	22,615	15,091	240.36	216.89	200.41	195.98	162.44
Total nonfatal	30,350	25,133	22,483	23,092	15,594	245.01	221.54	205.61	200.11	167.86
Grand total	30,780	25,485	22,756	23,442	15,865	248.48	224.64	208.11	203.14	170.78
	1926		1927		1928		1929		1930	
Number of men employed	127,823		119,699		113,866		118,735		103,233	
Number of shifts	37,160,978		34,033,963		32,803,610		34,618,120		27,869,982	
Number of 300-day workers	123,870		113,447		109,345		115,394		92,900	

[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, 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] Temporary disability: Lasting longer than the remainder of day of accident.

TABLE 2.—*Number of men employed, days of labor performed, and number of men killed and injured at all mines in the United States, 1911 to 1930*

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	156,088	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	179.59
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	248.56
Average for 5 years	282	167,337	157,192	47,157,559	630	4.01	31,159	198.22
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	170,640	162,091	48,627,502	624	3.85	35,730	220.43
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	26,060	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	151,943	143,830	43,149,112	531	3.69	33,586	233.51
1926	291	127,823	123,870	37,160,978	430	3.47	30,350	245.01
1927	284	119,699	113,447	34,033,963	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	40,677,057	482	3.55	31,022	228.79

ACKNOWLEDGMENTS

The facts brought out statistically in this publication are made known through an examination of reports voluntarily furnished by mine-operating companies throughout the country. Were it not for this cooperation of the operators, it would be impossible to obtain comparable records of mine accidents in different States, because of the different bases on which such records are prepared for State purposes. As comparable records are essential to the study of safety in mines and are especially needed when basic mining conditions are similar in many States, special acknowledgment is made to the mining companies whose courtesy in furnishing reports of their operations has made possible the preparation of comparable records of accidents for the entire metal-mining industry.

RELATION OF STATISTICS TO CALENDAR YEAR

This and all other regular statistical reports published by the United States Bureau of Mines relate to calendar years. The data contained in this bulletin are intended to show the number of deaths and injuries resulting from accidents that occurred during the calendar year 1930. While every effort has been made to obtain complete figures covering accidents at all mines, it is possible that in a few cases the figures cover a fatality in 1930 that resulted from an accident that occurred late in 1929. No such cases, however, are known to the writer.

For accident-prevention studies, accidents should be charged to the year when they occurred, so that they may be studied in connection with the causes and conditions that produced them. The figures in this publication are intended to cover only deaths and injuries that resulted from accidents that occurred in 1930.

SCOPE OF STATISTICS

The tables in this paper are based on reports from 2,906 operators who worked their mines all or part of the year. Reports for mines in Alaska were furnished by the Territorial mine inspector and those for mines in California by the industrial commission of that State. Reports for all other States were received directly from the operating companies, except those for Arizona and Idaho; these were received from the companies through the offices of the State mine officials of those States. Reports for all States cover prospects as well as producing and nonproducing mines. It is believed that the figures published are reasonably complete for the metal-mining industry.

MINES CLASSIFIED

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

Copper mines.—This group comprises all of the copper mines and prospects reported in operation in the various copper-producing States.

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, and chromium. 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 in the Mississippi Valley only but also includes fluorspar mines in Illinois and Kentucky.

Nonmetallic mineral mines.—The nonmetallic mineral mines include those producing asbestos, asphaltum, barite, borax, emery, feldspar, flint, fluorspar (except in Illinois and Kentucky), garnet, graphite, gypsum, kaolin, 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 clay or sand and gravel.

CLASSIFICATION OF INJURIES

Statistics of accidents 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 lasting longer than the remainder of the day of accident. Beginning with 1915 and continuing through 1929 a "serious" injury, as the term was used in the bureau's reports, signified a temporary injury disabling an employee for more than 14 days. Beginning with 1930, all temporary injuries have been included in a single group, each injury causing disability for more than the remainder of the day on which the accident occurred.

During the latest five years (1926 to 1930) for which figures are available, 118,328 injuries to employees at metal mines and nonmetallic mines (except coal) have been reported to the bureau. Of this number, 1,676 (1.42 per cent) caused the death of the injured employees, 94 (0.08 per cent) resulted in permanent total disability, 2,560 (2.16 per cent) caused permanent partial disability, and 113,998 (96.34 per cent) were temporary injuries that disabled the employees for more than the remainder of the day on which the accident occurred. As more than 166,000,000 man-shifts of work were performed at the mines during the 5-year period, the foregoing percentage distribution of accidents may be accepted as typical of the severity of accidental injuries to metal-mine employees in the United States.

TABLE 3.—*All mines: Men employed and days of labor performed, by kinds of mines, during the year ended December 31, 1930 and 1929*

Kind of mine	Active operators	Men employed				Days of labor performed				Average days active			
		Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total
1930													
Copper	196	18,569	7,138	1,985	27,692	5,427,527	2,154,924	667,786	8,250,237	292	302	336	298
Gold, silver, and miscellaneous metal	2,255	18,214	8,022	809	27,045	5,045,485	2,061,665	168,453	7,275,603	277	257	208	269
Iron	88	16,317	6,622	6,471	29,410	4,427,868	1,775,004	1,520,283	7,723,155	271	268	235	263
Lead and zinc (Mississippi Valley) [1]	77	7,444	1,037	43	8,524	1,605,455	224,883	6,485	1,836,823	216	217	151	215
Nonmetallic mineral	290	2,920	4,107	3,535	10,562	686,984	1,238,106	859,074	2,784,164	235	301	243	264
Total	2,906	63,464	26,926	12,843	103,233	17,193,319	7,454,582	3,222,081	27,869,982	271	277	251	270
1929													
Copper	204	25,239	8,632	3,276	37,147	8,016,491	2,823,557	1,143,664	11,983,712	318	327	349	323
Gold, silver, and miscellaneous metal	2,139	21,397	8,554	910	30,861	6,276,449	2,220,249	201,747	8,698,445	293	260	222	282
Iron	89	15,443	6,660	6,116	28,219	4,456,951	1,904,187	1,689,840	8,050,978	289	286	276	285
Lead and zinc (Mississippi Valley) [1]	85	9,755	1,371	51	11,177	2,387,306	331,791	16,690	2,735,787	245	242	327	245
Nonmetallic mineral	276	3,389	4,158	3,784	11,331	860,188	1,274,520	1,014,490	3,149,198	254	307	268	278
Total	2,793	75,223	29,375	14,137	118,735	21,997,385	8,554,304	4,066,431	34,618,120	292	291	288	292

[1] Includes fluorspar mines in Illinois and Kentucky.

TABLE 4.—*All mines: Number killed and injured, by kinds of mines, during the years ended December 31, 1930 and 1929*

Kind of mine	Number killed				Number injured (time lost, 1 day or more)				Widows	Orphans
	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total		
1930										
Copper	70	6	------	76	4,593	518	210	5,321	34	86
Gold, silver, and miscellaneous metal	99	8	2	109	4,946	815	52	5,813	44	56
Iron	56	6	7	69	1,660	192	244	2,096	48	104
Lead and zinc (Mississippi Valley) [1]	9	1	------	10	966	115	------	1,081	12	16
Nonmetallic mineral	3	3	1	7	456	491	336	1,283	5	4
Total	237	24	10	271	12,621	2,131	842	15,594	143	266
1929										
Copper	108	9	4	121	7,625	833	483	8,941	33	56
Gold, silver, and miscellaneous metal	93	12	1	106	6,824	931	55	7,810	41	87
Iron	58	3	19	80	1,732	261	411	2,404	43	94
Lead and zinc (Mississippi Valley) [1]	17	2	------	19	1,965	204	4	2,173	12	31
Nonmetallic mineral	16	5	3	24	532	688	544	1,764	9	20
Total	292	31	27	350	18,678	2,917	1,497	23,092	138	288

[1] Includes fluorspar mines in Illinois and Kentucky.

TABLE 5.—*All mines: Fatalities and injuries per thousand 300-day workers employed during the years ended December 31, 1911 to 1930*

Kind of mine	Number of 300-day workers				Killed per thousand 300-day workers				Injured per thousand 300-day workers			
	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total
1930												
Copper	18,092	7,183	2,226	27,501	3.87	0.84	------	2.76	253.87	72.11	94.34	193.48
Gold, silver, and miscellaneous metal	16,818	6,872	562	24,252	5.89	1.16	3.56	4.49	294.09	118.60	92.53	239.69
Iron	14,760	5,917	5,067	25,744	3.79	1.01	1.38	2.68	112.47	32.45	48.15	81.42
Lead and zinc (Mississippi Valley) [1]	5,351	750	22	6,123	1.68	1.33	------	1.63	180.53	153.33	------	176.55
Nonmetallic mineral	2,290	4,127	2,863	9,280	1.31	.73	.35	.75	199.13	118.97	117.36	138.25
Total, 1930	57,311	24,849	10,740	92,900	4.14	.97	.93	2.92	220.22	85.76	78.40	167.86
1929												
Copper	26,722	9,412	3,812	39,946	4.04	.96	1.05	3.03	285.35	88.50	126.71	223.83
Gold, silver, and miscellaneous metal	20,921	7,401	673	28,995	4.45	1.62	1.49	3.66	326.18	125.79	81.72	269.36
Iron	14,857	6,347	5,633	26,837	3.90	.47	3.37	2.98	116.58	41.12	72.96	89.58
Lead and zinc (Mississippi Valley) [1]	7,958	1,106	55	9,119	2.14	1.81	------	2.08	246.92	184.45	72.73	238.29
Nonmetallic mineral	2,867	4,248	3,382	10,497	5.58	1.18	.89	2.29	185.56	161.96	160.85	168.05
Total, 1929	73,325	28,514	13,555	115,394	3.98	1.09	1.99	3.03	254.73	102.30	110.44	200.11
Total, 1928	68,237	27,760	13,348	109,345	3.33	1.12	1.12	2.50	264.74	114.48	92.90	205.61
Total, 1927	71,307	28,618	13,522	113,447	4.07	1.19	2.07	3.10	286.76	107.69	118.55	221.54
Total, 1926	78,985	31,040	13,845	123,870	4.43	1.51	2.38	3.47	308.59	130.12	139.91	245.01
Total, 1925	78,784	30,211	14,913	123,908	3.96	1.13	1.68	2.99	364.76	143.95	137.13	283.53
Total, 1924	72,631	30,879	15,603	119,113	4.86	.91	2.37	3.51	366.80	146.31	125.55	278.04
Total, 1923	73,669	31,372	16,825	121,866	3.92	1.34	2.14	3.01	362.54	159.54	109.96	275.41
Total, 1922	59,454	26,611	11,073	97,138	5.01	.83	2.17	3.54	348.71	151.59	118.67	268.48
Total, 1921	45,199	20,226	9,085	74,510	4.03	1.38	2.20	3.09	312.84	153.81	148.93	249.69
Total, 1920	80,215	36,170	18,155	134,540	4.16	1.47	2.09	3.16	310.99	139.45	141.67	242.02
Total, 1919	85,769	36,376	12,726	134,871	4.52	1.15	2.99	3.47	289.16	127.61	162.11	233.60
Total, 1918	113,438	47,726	19,842	181,006	4.52	1.15	3.93	3.57	290.62	140.13	164.30	237.09
Total, 1917	125,990	47,144	18,951	192,085	5.77	1.38	3.17	4.44	291.73	127.38	186.06	240.97
Total, 1916	128,021	50,248	14,186	192,455	4.48	1.51	3.31	3.62	300.33	124.58	248.70	250.64
Total, 1915	91,485	36,895	13,617	141,997	4.93	1.30	3.97	3.89	314.03	104.97	197.77	248.56
Total, 1914	93,618	34,684	14,318	142,620	4.98	1.07	3.91	3.92	256.33	89.84	216.72	211.87
Total, 1913	121,648	61,946	------	183,594	4.50	2.18	------	3.72	209.83	120.20	------	179.59
Total, 1912	104,688	56,371	------	161,059	4.99	2.47	------	4.10	237.47	104.20	------	190.82
Total, 1911	98,976	57,112	------	156,088	5.48	2.68	------	4.45	215.99	90.03	------	170.27

[1] Includes fluorspar mines in Illinois and Kentucky.

ACCIDENT STATISTICS, BY STATES

Tables 6 to 13, inclusive, give a compilation of accident statistics, by States, for all metal mines operated in 1930. The fatalities and injuries in 1930 are classified to show the causes of accidents in each group of mines and the percentage of accidents due to any one cause. (See Tables 24 to 26.) At the bottom of Table 24 similar percentage figures are given for the 19-year period, 1911 to 1929. Tables 53 to 56, inclusive, give summary data, by States and years, relating to labor, accidents, etc., for 1911 to 1925 by 5-year periods and for 1927, 1928, 1929, and 1930 separately.

TABLE 6.—*All mines: Number of active operators reporting during the year ended December 31, 1930*

State	Copper	Gold, silver, and miscellaneous metal	Iron	Lead and zinc (Mississippi Valley)	Nonmetallic mineral	Total, 1930	Total, 1929
Alabama		2	8		3	13	16
Alaska	3	511				514	519
Arizona	70	155			6	231	193
California	10	419			47	476	538
Colorado	7	232	1		20	260	245
Florida					9	9	11
Georgia		2	1		11	14	14
Idaho	24	395			6	425	382
Illinois				7	2	9	6
Iowa				1	8	9	8
Kansas				17	8	25	31
Kentucky				9	5	14	13
Michigan	7		27		6	40	39
Minnesota		4	24			28	29
Missouri			2	7	7	16	16
Montana	14	105	1		7	127	97
Nevada	12	140	1		13	166	150
New Jersey		1	4		1	6	5
New Mexico	10	25	1		5	41	46
New York		1	5		21	27	31
North Carolina	1				11	12	7
Oklahoma				28	3	31	35
Oregon	5	53				58	58
Pennsylvania			1		10	11	9
South Dakota		20			6	26	20
Tennessee	2	1	2	3	9	17	17
Texas		7			11	18	17
Utah	11	95	3		8	117	113
Virginia		5	2		10	17	17
Washington	14	53	1		2	70	52
Wisconsin			3	5	2	10	11
Wyoming	6	22	1		2	31	14
Other States		7			31	38	34
Total, 1930	196	2,255	88	77	290	2,906	
Total, 1929	204	2,139	89	85	276		2,793

TABLE 7.—*All mines: Number of employees and equivalent in 300-day workers, by States, during the year ended December 31, 1930*

State	Employees					Equivalent in 300-day workers				
	Underground	Surface	Open pit	Total, 1930	Total, 1929	Underground	Surface	Open pit	Total, 1930	Total, 1929
Alabama	3,429	1,149	388	4,966	5,195	2,858	1,055	340	4,253	4,626
Alaska	897	2,344	-------	3,241	3,448	838	1,878	-------	2,716	2,601
Arizona	7,268	2,407	487	10,162	13,072	6,901	2,323	481	9,705	14,215
California	3,850	1,774	317	5,941	7,455	3,270	1,471	221	4,962	6,374
Colorado	2,531	640	62	3,233	3,472	2,244	571	32	2,847	3,357
Florida	-------	640	925	1,565	1,570	-------	644	871	1,515	1,514
Georgia	47	15	140	202	273	45	15	111	171	220
Idaho	3,406	985	21	4,412	4,610	3,029	815	8	3,852	4,413
Illinois	272	72	36	380	380	171	48	18	237	344
Iowa	124	39	29	192	208	70	29	23	122	162
Kansas	1,691	266	-------	1,957	3,164	1,146	224	-------	1,370	2,380
Kentucky	303	267	512	1,082	1,022	215	165	280	660	786
Michigan	10,900	5,104	406	16,410	15,888	10,173	4,702	341	15,216	15,897
Minnesota	4,244	1,812	5,706	11,762	11,014	4,044	1,582	4,326	9,952	10,469
Missouri	2,195	299	73	2,567	2,682	2,027	278	55	2,360	2,565
Montana	5,378	1,059	54	6,491	11,523	5,271	1,000	42	6,313	11,494
Nevada	1,947	771	247	2,965	3,783	2,050	840	289	3,179	4,086
New Jersey	1,106	289	5	1,400	1,120	953	245	5	1,203	1,025
New Mexico	1,136	599	482	2,217	2,617	1,183	620	519	2,322	3,008
New York	1,834	458	42	2,334	2,424	1,651	430	23	2,104	2,204
North Carolina	174	116	285	575	416	162	117	284	563	379
Oklahoma	2,969	310	78	3,357	4,716	1,725	176	63	1,964	3,740
Oregon	214	130	25	369	405	163	97	23	283	358
Pennsylvania	185	92	230	507	498	174	86	188	448	456
South Dakota	867	790	19	1,676	1,246	865	786	15	1,666	1,479
Tennessee	705	640	424	1,769	1,971	709	630	398	1,737	1,944
Texas	276	1,611	132	2,019	1,979	221	1,911	109	2,241	2,247
Utah	3,364	1,058	930	5,352	7,901	3,392	1,109	1,079	5,580	8,740
Virginia	394	531	257	1,182	1,233	368	438	173	979	1,196
Washington	312	127	67	506	378	223	107	51	381	333
Wisconsin	780	369	5	1,154	1,407	703	341	3	1,047	1,312
Wyoming	174	69	31	274	429	92	35	18	145	430
Other States	492	94	428	1,014	1,236	375	81	351	807	1,040
Total, 1930	63,464	26,926	12,843	103,233	-------	57,311	24,849	10,740	92,900	-------
Total, 1929	75,223	29,375	14,137	-------	118,735	73,325	28,514	13,555	-------	115,394

TABLE 8.—*All mines: Total man-days of labor and average workdays per man, by States, during the year ended December 31, 1930*

State	Days of labor performed					Average days active				
	Underground	Surface	Open pit	Total, 1930	Total, 1929	Underground	Surface	Open pit	Total, 1930	Total, 1929
Alabama	857,192	316,647	102,097	1,275,936	1,387,802	250	276	263	257	267
Alaska	251,474	563,314	-------	814,788	780,439	280	240	-------	251	226
Arizona	2,070,299	696,840	144,284	2,911,423	4,264,635	285	290	296	287	326
California	981,073	441,346	66,193	1,488,612	1,912,172	255	249	209	251	256
Colorado	673,185	171,181	9,651	854,017	1,007,083	266	267	156	264	290
Florida	-------	193,238	261,242	454,480	454,258	-------	302	282	290	289
Georgia	13,475	4,380	33,420	51,275	65,980	287	292	239	254	242
Idaho	908,491	244,649	2,307	1,155,447	1,323,935	267	248	110	262	287
Illinois	51,329	14,297	5,400	71,026	103,285	189	199	150	187	272
Iowa	21,075	8,789	6,876	36,740	48,638	170	225	237	191	234
Kansas	343,927	67,168	-------	411,095	713,891	203	253	-------	210	226
Kentucky	64,562	49,359	83,912	197,833	235,805	213	185	164	183	231
Michigan	3,051,923	1,410,700	102,199	4,564,822	4,768,968	280	276	252	278	300
Minnesota	1,213,172	474,660	1,297,813	2,985,645	3,140,758	286	262	227	254	285
Missouri	607,996	83,383	16,697	708,076	769,513	277	279	229	276	287
Montana	1,581,227	299,888	12,658	1,893,773	3,448,092	294	283	234	292	299
Nevada	615,057	251,949	86,748	953,754	1,225,725	316	327	351	322	324
New Jersey	286,002	73,519	1,500	361,021	307,468	259	254	300	258	275
New Mexico	354,788	186,025	155,760	696,573	902,519	312	311	323	314	345
New York	495,416	128,868	6,755	631,039	661,281	270	281	161	270	273
North Carolina	48,487	35,248	85,279	169,014	113,572	279	304	299	294	273
Oklahoma	517,357	52,739	19,069	589,165	1,121,887	174	170	244	176	238
Oregon	48,787	29,265	6,962	85,014	107,217	228	225	278	230	265
Pennsylvania	52,245	25,810	56,242	134,297	136,717	282	281	245	265	275
South Dakota	259,427	235,746	4,684	499,857	443,776	299	298	247	298	356
Tennessee	212,870	189,125	119,372	521,367	583,344	302	296	282	295	296

TABLE 8.—*All mines: Total man-days of labor and average workdays per man, by States, during the year ended December 31, 1930*—Continued

State	Days of labor performed					Average days active				
	Underground	Surface	Open pit	Total, 1930	Total, 1929	Underground	Surface	Open pit	Total, 1930	Total, 1929
Texas	66,405	573,313	32,585	672,303	674,185	241	356	247	333	341
Utah	1,017,637	332,504	323,812	1,673,953	2,621,936	303	314	348	313	332
Virginia	110,360	131,493	52,074	293,927	358,940	280	248	203	249	291
Washington	66,923	32,069	15,213	114,205	99,814	214	253	227	226	264
Wisconsin	210,950	102,239	750	313,939	393,462	270	277	150	272	280
Wyoming	27,693	10,507	5,335	43,535	128,977	159	152	172	159	301
Other States	112,515	24,324	105,192	242,031	312,046	229	259	246	239	252
Total, 1930	17,193,319	7,454,582	3,222,081	27,869,982		271	277	251	270	
Total, 1929	21,997,385	8,554,304	4,066,431		34,618,120	292	291	288		292

TABLE 9.—*All mines: Deaths and injuries from accidents, by States, during the year ended December 31, 1930*

State	Number killed					Number injured				
	Underground	Surface	Open pit	Total, 1930	Total, 1929	Underground	Surface	Open pit	Total, 1930	Total, 1929
Alabama	11	2		13	16	233	26	19	278	583
Alaska	5	1		6	14	180	189		369	373
Arizona	17	3		20	30	1,178	145	58	1,381	2,431
California	28	1		29	31	1,135	227	49	1,411	1,448
Colorado	14	1		15	21	570	87		657	826
Florida				0	2		52	58	110	254
Georgia				0		6	3	7	16	36
Idaho	18	1		19	14	816	108	2	926	1,083
Illinois	1			1		24	9		33	37
Iowa				0		9	3	2	14	28
Kansas	2			2	7	242	32		274	574
Kentucky				0	1	24	23	36	83	156
Michigan	42	4		46	38	1,922	192	7	2,121	2,572
Minnesota	16	1	7	24	32	314	54	235	603	661
Missouri	4			4		332	62	12	406	496
Montana	23		1	24	41	1,416	75	2	1,493	3,260
Nevada	8	1	1	10	17	479	70	46	595	840
New Jersey	4	1		5	6	203	18	1	222	171
New Mexico	3	2		5	10	418	53	78	549	696
New York	8			8	9	666	68	1	735	615
North Carolina				0	1	46	26	43	115	108
Oklahoma	1			1	9	404	45	16	465	1,163
Oregon	2			2		24	22	1	47	46
Pennsylvania	1			1	2	17	3	4	24	20
South Dakota	5	2		7	2	251	92	2	345	495
Tennessee	4	3		7	5	56	57	26	139	141
Texas		1	1	2	2	50	209	23	282	482
Utah	16			16	29	1,348	92	46	1,486	2,972
Virginia	1			1	3	64	54	28	146	172
Washington	1			1		43	19		62	62
Wisconsin	2			2	2	59	9		68	109
Wyoming				0	3	14	2	3	19	79
Other States				0	3	78	5	37	120	103
Total, 1930	237	24	10	271		12,621	2,131	842	15,594	
Total, 1929	292	31	27		350	18,678	2,917	1,497		23,092

TABLE 10.—*All mines: Fatality rates and injury rates, by States, during the year ended December 31, 1930*

State	Killed per thousand 300-day workers					Injured per thousand 300-day workers				
	Underground	Surface	Open pit	Total, 1930	Total, 1929	Underground	Surface	Open pit	Total, 1930	Total, 1929
Alabama	3.85	1.90	.....	3.06	3.46	81.53	24.64	55.88	65.37	126.03
Alaska	5.97	.53	.....	2.21	5.38	214.80	100.64	.....	135.86	143.41
Arizona	2.46	1.29	.....	2.06	2.11	170.70	62.42	120.58	142.30	171.01
California	8.56	.68	.....	5.84	4.86	347.09	154.32	221.72	284.36	227.17
Colorado	6.24	1.75	.....	5.27	6.26	254.01	152.36	.....	230.77	246.05
Florida	.....	.....	.....	.....	1.32	.....	80.75	66.59	72.61	167.77
Georgia	.....	.....	.....	.....	.....	133.33	.....	63.06	93.57	163.64
Idaho	5.94	1.23	.....	4.93	3.17	269.40	132.52	.....	240.39	245.41
Illinois	5.85	.....	.....	4.22	.....	140.35	.....	.....	139.24	107.56
Iowa	.....	.....	.....	.....	.....	128.57	.....	.....	114.75	172.84
Kansas	1.75	.....	.....	1.46	2.94	211.17	142.86	.....	200.00	241.18
Kentucky	.....	.....	.....	.....	1.27	111.63	139.39	128.57	125.76	198.47
Michigan	4.13	.85	.....	3.02	2.39	188.93	40.83	20.53	139.39	161.79
Minnesota	3.96	.63	1.62	2.41	3.06	77.65	34.13	54.32	60.59	63.14
Missouri	1.97	.....	.....	1.69	.....	163.79	223.02	218.18	172.03	193.37
Montana	4.36	.....	.....	3.80	3.57	268.64	75.00	.....	236.50	283.63
Nevada	3.90	1.19	3.46	3.15	4.16	233.66	83.33	159.17	187.17	205.58
New Jersey	4.20	4.08	.....	4.16	5.85	213.01	73.47	.....	184.54	166.83
New Mexico	2.54	3.23	.....	2.15	3.32	353.34	85.48	150.29	236.43	231.38
New York	4.85	.....	.....	3.80	4.08	403.39	158.14	.....	349.33	279.04
North Carolina	.....	.....	.....	.....	2.64	283.95	222.22	151.41	204.26	284.96
Oklahoma	.58	.....	.....	.51	2.41	234.20	255.68	253.97	236.76	310.96
Oregon	12.27	.....	.....	7.07	.....	147.24	226.80	.....	166.08	128.49
Pennsylvania	5.75	.....	.....	2.23	4.39	97.70	34.88	21.28	53.57	43.86
South Dakota	5.78	2.54	.....	4.20	1.35	290.17	117.05	.....	207.08	334.69
Tennessee	5.64	4.76	.....	4.03	2.57	78.98	90.48	65.33	80.02	72.53
Texas	.....	.52	9.17	.89	.89	226.24	109.37	211.01	125.84	214.51
Utah	4.72	.....	.....	2.87	3.32	397.41	82.96	42.63	266.31	340.05
Virginia	2.72	.....	.....	1.02	2.51	173.91	123.29	161.85	149.13	143.81
Washington	4.48	.....	.....	2.62	.....	192.83	177.57	.....	162.73	186.19
Wisconsin	2.84	.....	.....	1.91	1.52	83.93	26.39	.....	64.95	83.08
Wyoming	.....	.....	.....	.....	6.98	152.17	.....	.....	131.03	183.72
Other States	.....	.....	.....	.....	2.88	208.00	61.73	105.41	148.70	99.04
Total, 1930	4.14	.97	.93	2.92	.....	220.22	85.76	78.40	167.86	.....
Total, 1929	3.98	1.09	1.99	.....	3.03	254.73	102.30	110.44	.....	200.11

TABLE 11.—*All mines: Widows and orphans caused by fatal accidents, by States, during the years ended December 31, 1929 and 1930*

State [1]	1930		1929		State [1]	1930		1929	
	Widows	Orphans	Widows	Orphans		Widows	Orphans	Widows	Orphans
Alabama	9	9	6	15	New York	4	8	1	2
Arizona	12	33	13	17	Oklahoma	1	1	6	8
California	13	11	6	7	Pennsylvania	.....	.....	1	2
Colorado	4	6	11	20	South Dakota	5	6	2	.....
Florida	.....	.....	1	.....	Tennessee	6	14	4	15
Idaho	11	17	5	11	Texas	1	.....	1	1
Illinois	1	1	.....	.....	Utah	9	11	13	31
Kansas	2	4	5	13	Virginia	1	1	2	5
Michigan	33	63	23	46	Washington	1	.....	.....	.....
Minnesota	15	41	20	49	Wisconsin	2	4	.....	.....
Missouri	4	8	.....	.....	Other States	.....	.....	2	10
Montana	.....	.....	1	2					
Nevada	1	.....	4	4	Total, 1930	143	266	.....	.....
New Jersey	5	13	4	5	Total, 1929	.....	.....	138	288
New Mexico	3	15	7	25					

[1] No widows and orphans caused in Alaska, Georgia, Iowa, Kentucky, North Carolina, Oregon, and Wyoming.

TABLE 12.—*All mines: Fatalities, by causes and States, during the year ended December 31, 1930*

State[1]	Underground																	Shaft[2]					
	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 (other than locomotives or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock or ore)	Other causes	Total, underground	Falling down shaft	Objects falling down shaft	Breaking of cables	Skip, cage or bucket	Other causes	Total, shaft
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15a	15b		16	17	18	20	21	
Alabama	4			1	3											1	9			1	1		2
Alaska	1				1	2											4		1				1
Arizona	4			5	2	3										1	15				1	1	2
California	6		2	5	3	1				1	5		1				24	1	1		2		4
Colorado	9					2	1									1	13				1		1
Idaho	4			4		5			2								15			2	1		3
Illinois	1																1						0
Kansas	2																2						0
Michigan	13	2	1	7	2				3	1	1	1		1		3	35	4	1		2		7
Minnesota	7	2		3					1								13				3		3
Missouri	1				2	1											4						0
Montana	10			2	4	1	1		1						1	1	21				1	1	2
Nevada	1			1		2				2		1					7		1				1
New Jersey	2			1													3	1					1
New Mexico	2					1											3						0
New York	3			3	2												8						0
Oklahoma						1											1						0
Oregon	1																1				1		1
Pennsylvania	1																1						0
South Dakota	1	1														1	3					2	2
Tennessee	3																3				1		1
Texas																							
Utah	3			2	3	2											10	3	1		2		6
Virginia	1																1						0
Washington						1											1						0
Wisconsin		1				1											2						0
Total, 1930	80	6	3	34	22	23	2		7	4	6	2	1	1	1	8	200	9	5	3	16	4	37
Total, 1929	115	7	3	33	32	21	5	1	6	4	3	8	1		3	7	249	13	7		19	4	43

[1] No fatalities in Florida, Georga, Iowa, Kentucky, North Carolina, Wyoming, and "Other States."

[2] No fatalities caused by overwinding in shafts (col. 19).

TABLE 12.—*All mines: Fatalities, by causes and States, during the year ended December 31, 1930*—Continued

State	Surface [3]										Open pit [4]								
	Mine cars, mine locomotives, or aerial trams	Railway cars and locomotives	Run or fall of ore in or from ore bins	Falls of persons	Hand tools	Electricity	Machinery	Handling materials	Other causes	Total, surface	Falls or slides of rock or ore	Explosives	Haulage	Power shovels	Machinery (other than locomotives or power shovels)	Handling materials	Other causes	Total, open pit	Grand total
	22	23	24	25	27	28	29	30a	30b		31	32	33	34	38	41a	41b		
Alabama	1		1							2								0	13
Alaska	1									1								0	6
Arizona				1					2	3								0	20
California								1		1								0	29
Colorado									1	1								0	15
Idaho									1	1								0	19
Illinois										0								0	1
Kansas										0								0	2
Michigan				3				1		4								0	46
Minnesota				1						1	1	4		2				7	24
Missouri										0								0	4
Montana										0	1							1	24
Nevada				1						1	1							1	10
New Jersey								1		1								0	5
New Mexico	1							1		2								0	5
New York										0								0	8
Oklahoma										0								0	1
Oregon										0								0	2
Pennsylvania										0								0	1
South Dakota						1			1	2								0	7
Tennessee				1		1	1			3								0	7
Texas						1				1		1						1	2
Utah										0								0	16
Virginia										0								0	1
Washington										0								0	1
Wisconsin										0								0	2
Total, 1930	3		1	7		3	1	4	5	24	3	5		2				10	271
Total, 1929	3	3		7	2	2	3		11	31	8	5	7	2	1	1	3	27	350

[3] No fatalities caused by stepping on nail (col. 26) at surface.

[4] No fatalities caused by falls of persons (col. 35), falls of derricks, booms, etc. (col. 36), run or fall of ore in or from ore bins (col. 37), electricity (col. 39), or hand tools (col. 40) at open pits.

TABLE 13.—*All mines: Injuries, by causes and States, during the year ended December 31, 1930*

State	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 (other than locomotives or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15a	15b		16	17	18	19	20	21	
Alabama	34	16	6	3	91	6		3	2	3	1			2	33	27	227					6		6
Alaska	45	2	16	8	11		14	6					3	2		70	177		1			1	1	3
Arizona	296	73	144	45	142	52	9	71	1	6		8		22	29	240	1, 138	6	12			3	19	40
California	252	107	181	15	113	116	26	96	3	19	3	2	2	51	52	67	1, 105	1	4			25		30
Colorado	150	60	69	5	63	26	18	44	2	11				18	37	61	564		2			3	1	6
Florida																	0							0
Georgia			1													5	6							0
Idaho	193	89	97	17	67	22	7	54	1	7				72	76	89	791	2	8			3	12	25
Illinois	4	2	2	1	7	1										7	24							0
Iowa		6			2											1	9							0
Kansas	23	101	1	1	36	3	3	28	1	1		1		1	3	27	230	1	4			7		12
Kentucky	6		3		5	3		1		2						4	24							0
Michigan	385	332	145	16	241	91	112	185	6	31		1		19	14	197	1, 775	20	54			17	56	147
Minnesota	64	20	72	3	44	5	5	6	1	14				9	24	43	310	1	2				1	4
Missouri	45	51	10	1	66	14	4	41	4	2				11	27	46	322	1	4			1	4	10
Montana	424	160	270	11	154	51	7	101		6				45	27	134	1, 390	1	8	2		6	9	26
Nevada	99	66	65	4	35	31	22	39	4	7		2		23	18	48	463	1	2			8	5	16
New Jersey	24	37	23	6	19	7	10	26		1				4	9	31	197		2			1	3	6
New Mexico	129	85	23	2	34	25	12	35		4				10	7	30	396	2	6			3	11	22
New York	47	242	12	1	54	17	10	98	7	19				12	33	112	664					1	1	2
North Carolina	3	16	4		3	1		6						1	2	7	43	1				1	1	3
Oklahoma	13	122	13		68	5		44	2	2		2		15	6	96	388	1	6		1	7	1	16
Oregon	7		3		6			3						2	3		24							0
Pennsylvania	2	2	2	1	3		1	1		1					1	2	16	1						1
South Dakota	19	56		1	16	4		20		1					1	132	250		1					1
Tennessee	6	11	5		12	1	3	11						2	1	3	55		1					1
Texas	16	9		2	6	1		5		1					3	7	50							0
Utah	248	157	188	10	183	95	22	97	3	24	1	13	1	53	57	158	1, 310	1	8			20	9	38
Virginia	11	15	11		10	4		7		2					1	2	63		1					1
Washington	7	4	6		1			9		1				4	2	3	37						6	6
Wisconsin	12	17	6		8	1	1	1		1				9	1	2	59							0
Wyoming	1	1	1	2	2	1	1								2	3	14							0
Other States	5	13	2	2	14	3	6	4		2				4	5	17	77						1	1
Total, 1930	2, 570	1, 872	1, 381	157	1, 516	586	293	1, 042	37	168	5	29	6	391	474	1, 671	12, 198	40	126	2	1	113	141	423
Total, 1929	3, 545	2, 627	2, 238	178	2, 558	841	448	1, 490	37	223	4	26	2	509	635	2, 743	18, 104	43	162	5	4	153	207	574

TABLE 13.—*All mines: Injuries, by causes and States, during the year ended December 31, 1930*—Continued

State	Surface											Open pit												Grand total
	Mine cars, mine locomotives, or aerial trams	Railway cars and locomotives	Run or fall of ore in or from ore bins	Falls of persons	Stepping on nail	Hand tools	Electricity	Machinery	Handling materials	Other causes	Total, surface	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 or from ore bins	Machinery (other than locomotives or power shovels)	Electricity	Hand tools	Handling materials	Other causes	Total, open pit	
	22	23	24	25	26	27	28	29	30a	30b		31	32	33	34	35	36	37	38	39	40	41a	41b		
Alabama	6			2		5		3	7	3	26	1		2		1					4	2	9	19	278
Alaska	4		1	40	13	24	4	14		89	189													0	369
Arizona	3	3	2	17	11	7	1	15	17	69	145	6	1	8	10	2	1		1		7	12	10	58	1,381
California	4	1	7	26	11	45	7	42	41	43	227	5	4	12	2	6		1	9		6	4		49	1,411
Colorado	9	4	6	20	3	15	1	5	13	11	87													0	657
Florida	1	6		6		6		6	6	21	52	2	2		3	8	1		10	1	3	8	20	58	110
Georgia	2					1					3	1		3								3		7	16
Idaho	5		2	11	7	10		13	39	21	108											1	1	2	926
Illinois				1	1			1		6	9													0	33
Iowa					1			1		1	3			1							1			2	14
Kansas	2	3	3	2	2	3		6	8	3	32													0	274
Kentucky		2		2	1	1		5	8	4	23	4	1	5	5	5			2		1	7	6	36	83
Michigan	1	9	13	39	1	22	2	16	13	76	192			2				1	2		1		1	7	2,121
Minnesota	5	1		15	2	2		5	13	11	54	16	5	34	22	17	1		12		19	63	46	235	603
Missouri			1	15	21	7		3	3	12	62	2		2		7						1		12	406
Montana	8	2	3	22		16		5	11	8	75	2												2	1,493
Nevada	3	2	1	11	10	11		13	7	12	70	8	1	3	1	12	1			1	4	11	4	46	595
New Jersey	2			3		2		1	2	8	18												1	1	222
New Mexico	6	1	1	4	1	12		3	8	17	53	8	5	4	4	2			3	2	8	18	24	78	549
New York	2		5	9	10	8	4	3	7	20	68												1	1	735
North Carolina		3	1	5		3		2	3	9	26	6		5	1	5	1	1			7	9	8	43	115
Oklahoma	5		2	4	6	2		3	7	16	45	1	1	1							3	10		16	465
Oregon				2	6	5		3	4	2	22			1										1	47
Pennsylvania		1				1			1		3	1				1						1	1	4	24
South Dakota				3				2	2	85	92	1										1		2	345
Tennessee	4	3		9	3	15		2	11	10	57	1		2	8	2	2	1			1	3	6	26	139
Texas	1	1		7	11	20	4	27	58	80	209	7	1	1	1	1			1		6	5		23	282
Utah	7	2	4	18	6	7	2	7	14	25	92	6	2	11		7			1		4	10	5	46	1,486
Virginia				6	2	4		6	8	28	54	2		3		5			2		4	1	11	28	146
Washington	3			1		4		1	5	5	19													0	62
Wisconsin				3				1	2	3	9													0	68
Wyoming									2		2	1				1						1		3	19
Other States					2			1	1	1	5	1	3	2		3		3	3		2	10	10	37	120
Total, 1930	83	44	52	303	131	258	25	215	321	699	2,131	82	26	102	57	85	7	7	46	4	81	181	164	842	15,594
Total, 1929	200	90	56	360	178	383	20	269	341	1,020	2,917	174	35	159	83	167	17	12	79	17	157	175	422	1,497	23,092

ACCIDENT STATISTICS, BY KINDS OF METAL PRODUCED

COPPER MINES

A substantial reduction in both the fatality rate and injury rate was reported by copper mines in 1930. An examination of records covering the past decade shows that the rate for 1930 was lower, both for fatalities and injuries, than in any other year during that period.

The accident-frequency rates per thousand full-time or 300-day employees were 2.76 for fatalities and 193.48 for injuries, as compared with 3.03 and 223.83, respectively, for the calendar year 1929.

Copper mines operating underground had a nonfatal injury rate of 253.87 per thousand full-time employees. This record was better than it has been during the past 10 years. The underground fatality rate was 3.87, lower than in the other years of the past decade except 1925.

The number of men working at copper mines in 1930 decreased sharply from the number employed in 1929, and the number of man-days of labor performed was reduced in even greater proportion. A reduction of 25 per cent was reported in the number of men employed, while the number of man-shifts declined 31 per cent. The average employee worked 298 days as compared with 323 days in the previous year.

Returns for 1930 covered 196 copper-mining companies employing 27,692 men who averaged 298 workdays per man. The total working time for all employees was 8,250,237 man-days.

Accidents at copper mines in 1930 caused 76 deaths and 5,321 injuries involving disability for more than the remainder of the day on which the accidents occurred. Included in the nonfatal injuries were 3 accidents that caused permanent total disability, 119 that caused permanent partial disability, and 5,199 temporary injuries lasting one day or more.

The chief causes of fatal accidents to underground workers were falling rock from the roof or wall, haulage, and explosives. Most of the nonfatal injuries underground were due to falling rock from the roof or wall, loading ore at the working face, hand tools, haulage, and drilling.

It is estimated that the fatalities and injuries from accidents at copper mines during 1930 represent a loss of time equal to 636,787 man-days, or 7.7 days for each 100 man-shifts worked and an average of 118 days per accident.

The leading copper States, with respect to the number of man-shifts worked, are Arizona, Michigan, Montana, and Utah. Most of the work in the last-named State is done by opencut mining methods. The following figures show the number of nonfatal and fatal accidents per thousand full-time workers in these four States. Each of the four leading States made marked progress in accident prevention during the year.

	1929	1930
Arizona	173.02	141.73
Michigan	293.13	263.93
Montana	292.47	211.82
Utah	82.10	61.81

TABLE 14.—*Copper mines: Men employed and days worked, by States, during the year ended December 31, 1930*

State	Active operators	Men employed				Days of labor performed				Average days active			
		Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total
Arizona	70	6,560	2,156	472	9,188	1,922,229	645,420	141,644	2,709,293	293	299	300	295
California	10	779	115	24	918	188,014	22,999	4,113	215,126	241	200	171	234
Idaho	24	89	24	3	116	15,642	4,058	250	19,950	176	169	83	172
Michigan	7	4,431	2,270	----------	6,701	1,291,906	657,601	----------	1,949,507	292	290	----------	291
Montana	14	4,472	859	----------	5,331	1,330,373	253,062	----------	1,583,435	297	295	----------	297
Nevada	12	680	441	210	1,331	226,379	160,059	76,356	462,794	333	363	364	348
New Mexico	10	375	401	470	1,246	113,618	127,390	153,710	394,718	303	318	327	317
Oregon	5	42	15	----------	57	12,862	5,261	----------	18,123	306	351	----------	318
Utah	11	196	376	800	1,372	63,331	136,462	290,333	490,126	323	363	363	357
Washington	14	122	76	3	201	35,597	25,109	780	61,486	292	330	260	306
Other States	19	823	405	3	1,231	227,576	117,503	600	345,679	277	290	200	281
Total 1930	196	18,569	7,138	1,985	27,692	5,427,527	2,154,924	667,786	8,250,237	292	302	336	298
Total, 1929	204	25,239	8,632	3,276	37,147	8,016,491	2,823,557	1,143,664	11,983,712	318	327	349	323

TABLE 15.—*Copper mines: Number of 300-day workers and number killed and injured during the year ended December 31, 1930*

State	Number of 300-day workers				Number killed				Number injured				Widows	Orphans
	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total		
Arizona	6,407	2,152	472	9,031	15	3	----------	18	1,082	122	58	1,262	12	33
California	627	77	13	717	3	----------	----------	3	186	14	----------	200	1	----------
Idaho	52	14	1	67	2	----------	----------	2	20	11	----------	31	1	1
Michigan	4,306	2,192	----------	6,498	22	1	----------	23	1,534	158	----------	1,692	15	33
Montana	4,435	843	----------	5,278	21	----------	----------	21	1,052	45	----------	1,097	----------	----------
Nevada	755	534	254	1,543	2	----------	----------	2	176	37	45	258	----------	----------
New Mexico	379	424	513	1,316	1	1	----------	2	219	29	78	326	2	10
Oregon	43	17	----------	60	1	----------	----------	1	7	1	----------	8	----------	----------
Utah	211	455	968	1,634	----------	----------	----------	----------	55	17	29	101	----------	----------
Washington	119	83	3	205	1	----------	----------	1	21	13	----------	34	1	----------
Other States	758	392	2	1,152	2	1	----------	3	241	71	----------	312	2	9
Total, 1930	18,092	7,183	2,226	27,501	70	6	----------	76	4,593	518	210	5,321	34	86
Total, 1929	26,722	9,412	3,812	39,946	108	9	4	121	7,625	833	483	8,941	33	56

GOLD, SILVER, AND MISCELLANEOUS METAL MINES

This group comprises mines producing gold or silver and those producing either of those metals in association with copper, lead, or zinc, as well as mines producing quicksilver, manganese, and other minor metals. The accident rate for the group as a whole was slightly above the level of the previous year for fatal accidents, while the rate for nonfatal accidents declined. The volume of employment was about 16 per cent below that for 1929, and the average number of workdays per man fell from 282 to 269. The reduction in employment applied generally to underground and opencut mining and to work at surface shops and yards.

Returns from producers showed 27,045 employees, of whom 18,214 worked underground. The amount of time worked by all employees was 7,275,603 man-shifts. Accidents caused 109 deaths and 5,813 nonfatal injuries, the latter figure indicating a much smaller number of injuries in 1930. The principal causes of fatalities underground were falls of rock or ore from the roof or wall; falling down chutes, winzes, and slopes; and explosives.

The chief causes of nonfatal injuries underground were falls of roof, loading ore, hand tools, haulage, and drilling. Table 24 shows the number of accidents due to the various causes.

An examination of the figures in Table 57, covering the 10 years 1921 to 1930, shows that the fatality rates for only two years, 1922 and 1924, were higher for this group of mines than in 1930. The nonfatal-injury rate was lower in 1930 than in any other year in this decade except 1921.

The loss of time or the period of disability resulting from accidents in 1930 is estimated at 925,000 man-days, a loss of 13 days for every hundred man-shifts worked and an average loss of 156 days per accident.

California, Idaho, and Utah were the leading States in this group in 1930 in the number of men employed, accounting for 45 per cent of the total number in this class of mines in all States. Lower accident rates were reported for Utah and Idaho but a higher rate for California, as shown by the following figures, which indicate the number of fatal and nonfatal injuries per thousand full-time or 300-day employees:

	1929	1930
California	264. 69	296. 13
Idaho	244. 98	234. 26
Utah	454. 85	362. 59

TABLE 16.—*Gold, silver, and miscellaneous metal mines: Men employed and days worked, by States, during the year ended December 31, 1930*

State [1]	Active operators	Men employed				Days of labor performed				Average days active			
		Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total
Alaska	511	690	2,200	----------	2,890	182,105	518,485	----------	700,590	264	236	----------	242
Arizona	155	626	220	13	859	122,276	42,544	2,240	167,060	195	193	172	194
California	419	2,746	1,550	115	4,411	705,750	390,181	27,669	1,123,600	257	252	241	255
Colorado	232	2,237	574	28	2,839	616,402	159,342	4,481	780,225	276	278	160	275
Idaho	395	3,229	928	17	4,174	872,395	230,588	2,007	1,104,990	270	248	118	265
Montana	105	875	199	54	1,128	244,539	46,726	12,658	303,923	279	235	234	269
Nevada	140	1,223	309	8	1,540	377,668	86,393	2,455	466,516	309	280	307	303
New Mexico	25	675	158	1	834	213,640	44,805	30	258,475	317	284	30	310
Oregon	53	172	115	25	312	35,925	24,004	6,962	66,891	209	209	278	214
South Dakota	20	858	790	3	1,651	256,727	235,746	1,095	493,568	299	298	365	299
Utah	95	3,047	590	10	3,647	932,253	183,695	1,872	1,117,820	306	311	187	307
Virginia	5	269	37	55	361	80,485	9,123	12,270	101,878	299	247	223	282
Washington	53	171	40	26	237	26,296	3,706	3,199	33,201	154	93	123	140
Wyoming	22	43	18	----------	61	5,824	2,205	----------	8,029	135	123	----------	132
Other States	25	1,353	294	454	2,101	373,200	84,122	91,515	548,837	276	286	202	261
Total, 1930	2,255	18,214	8,022	809	27,045	5,045,485	2,061,665	168,453	7,275,603	277	257	208	269
Total, 1929	2,139	21,397	8,554	910	30,861	6,276,449	2,220,249	201,747	8,698,445	293	260	222	282

[1] Georgia included in "Other States."

TABLE 17.—*Gold, silver, and miscellaneous metal mines: Number of 300-day workers and number killed and injured during the year ended December 31, 1930*

State [1]	Number of 300-day workers				Number killed				Number injured				Widows	Orphans
	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total		
Alaska	607	1,728		2,335	4	1		5	95	144		239		
Arizona	408	142	7	557	2			2	90	22		112		
California	2,352	1,300	93	3,745	24	1		25	876	193	15	1,084	11	10
Colorado	2,055	531	15	2,601	14	1		15	443	87		530	4	6
Idaho	2,908	769	7	3,684	16	1		17	765	79	2	846	10	16
Montana	815	156	42	1,013	2		1	3	357	30	2	389		
Nevada	1,259	288	8	1,555	6	1	1	8	294	25	1	320	1	
New Mexico	712	149		861	2			2	176	18		194	1	5
Oregon	120	80	23	223	1			1	17	21	1	39		
South Dakota	855	786	4	1,645	5	2		7	250	92		342	5	6
Utah	3,107	613	6	3,726	16			16	1,262	71	2	1,335	9	11
Virginia	268	31	41	340	1			1	54	1	4	59	1	1
Washington	88	12	11	111					14	2		16		
Wyoming	20	7		27										
Other States	1,244	280	305	1,829	6	1		7	253	30	25	308	2	1
Total, 1930	16,818	6,872	562	24,252	99	8	2	109	4,946	815	52	5,813	44	56
Total, 1929	20,921	7,401	673	28,995	93	12	1	106	6,824	931	55	7,810	41	87

[1] Georgia included in "Other States."

IRON MINES

The marked success that has attended accident-prevention efforts at iron mines during previous years continued through 1930. Reports from operating companies indicated gratifying reductions in the rates for both fatal and nonfatal accidents. According to returns received by the Bureau of Mines, the fatality rate per thousand employees (300-day workers) was 2.68 as compared with 2.98 for the previous year, and the injury rate was 81.42 as compared with 89.58.

A small increase (4 per cent) was reported in the average number of men employed at the mines; but the average workman was employed only 263 days as compared with 285 in the previous year, with the result that the total number of man-days worked in the industry as a whole was only 96 per cent of the number worked in 1929.

Reports from all companies showed 29,410 men employed, of whom 16,317 worked underground, 6,471 in opencut mining, and 6,622 at surface shops and yards. Employment totaled 7,723,155 man-shifts, of which 4,427,868 represented underground mining. Accidents during the year caused 69 deaths and 2,096 nonfatal injuries.

The chief causes of fatalities in the underground mines were falls of rock or ore from the roof or wall, explosives, and haulage. The largest number of nonfatal injuries was caused by loading ore at the face, by roof falls, and by haulage equipment, in the order stated. Seven fatalities were reported in opencut iron mines, and of these, four were caused by explosives, two by power shovels, and one by fall of rock

The nonfatal accidents at iron-ore mines in 1930 were classified as follows: 4 permanent total disabilities, 110 permanent partial disabilities, and 1,982 injuries causing disability for 1 or more days. It is estimated that these injuries and the 69 fatalities that occurred during the year represent a loss of time of 552,000 man-days. This estimated loss of time means an average loss of 255 man-days per accident and 7 days of disability for each hundred man-shifts worked at all iron-ore mines considered as a group.

The leading States in 1930, so far as iron-ore mines are concerned, were Minnesota, Michigan, and Alabama. Opencut mining is of major importance in Minnesota and accounts for more than a third of the number of man-shifts worked at iron mines within the State. Nearly all of the iron ore mined in Alabama and Michigan is obtained by underground mining methods. These three States accounted for 87 per cent of the total number of employees at iron mines in all States. The accident-frequency rate covering both fatal and nonfatal injuries was reduced substantially in all three States. The rates covering fatal and nonfatal injuries per thousand 300-day workers in these States during the past two years were as follows:

	1929	1930
Alabama	130. 26	69. 44
Michigan	54. 57	50. 09
Minnesota	62. 72	58. 43

TABLE 18.—*Iron mines: Men employed and days worked, by States, during the year ended December 31, 1930*

State [1]	Active operators	Men employed				Days of labor performed				Average days active			
		Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total
Alabama	8	3,388	1,139	330	4,857	844,717	313,547	94,629	1,252,893	249	275	287	258
Michigan	27	6,347	2,768	339	9,454	1,731,833	737,367	88,293	2,557,493	273	266	260	271
Minnesota	24	4,104	1,731	5,455	11,290	1,178,622	454,548	1,252,298	2,885,468	287	263	230	256
New Jersey	4	550	205	----------	755	118,087	47,995	----------	166,082	215	234	----------	220
New York	5	894	283	10	1,187	270,317	82,872	880	354,069	302	293	88	298
Wisconsin	3	556	272	----------	828	165,465	80,686	----------	246,151	298	297	----------	297
Other States	17	478	224	337	1,039	118,827	57,989	84,183	260,999	249	259	250	251
Total, 1930	88	16,317	6,622	6,471	29,410	4,427,868	1,775,004	1,520,283	7,723,155	271	268	235	263
Total, 1929	89	15,443	6,660	6,116	28,219	4,456,951	1,904,187	1,689,840	8,050,978	289	286	276	285

[1] Tennessee included in "Other States."

TABLE 19.—*Iron mines: Number of 300-day workers and number killed and injured during the year ended December 31, 1930*

State [1]	Number of 300-day workers				Number killed				Number injured				Widows	Orphans
	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total		
Alabama	2,815	1,045	316	4,176	11	1	----------	12	233	26	19	278	8	7
Michigan	5,773	2,458	294	8,525	19	3	----------	22	373	31	1	405	17	30
Minnesota	3,929	1,515	4,174	9,618	13	1	7	21	273	50	218	541	15	41
New Jersey	394	160	----------	554	3	----------	----------	3	104	12	----------	116	3	9
New York	901	276	3	1,180	6	----------	----------	6	560	52	----------	612	2	7
Wisconsin	552	269	----------	821	2	----------	----------	2	11	3	----------	14	2	4
Other States	396	194	280	870	2	1	----------	3	106	18	6	130	1	6
Total, 1930	14,760	5,917	5,067	25,744	56	6	7	69	1,660	192	244	2,096	48	104
Total, 1929	14,857	6,347	5,633	26,837	58	3	19	80	1,732	261	411	2,404	43	94

[1] Tennessee included in "Other States."

LEAD AND ZINC MINES (MISSISSIPPI VALLEY)

This group of mines includes all mines in the Mississippi Valley States that produce lead and zinc and the few mines in Illinois and Kentucky that produce fluorspar. The latter mines are included in the group because they are few in number and because their accident hazards and their methods of operation are similar to those in the lead and zinc mines.

Progress in safety in 1930 was indicated by reductions in the frequency rates for both fatal and nonfatal accidents. The fatality rate was 1.63 per thousand 300-day employees as compared with the previous year's rate of 2.08; the injury rate was 176.55 as compared with 238.29 in 1929.

As in other kinds of mining, the number of men working at lead and zinc mines in 1930 in the Mississippi Valley States was reduced greatly, being only 8,524, while the number working in 1929 was 11,177. The total volume of work done by all employees was equal to 1,836,823 man-shifts, a reduction of about 33 per cent from the preceding year. The average worker was employed 215 days as compared with 245 days in 1929.

Ten fatal accidents occurred during the year; 1 on the surface was caused by fall of person, and the remaining 9 underground were due to various causes, 6 of them to falling rock, 2 to haulage, and 1 to falling down a chute or winze.

Nonfatal injuries were due chiefly to loading ore at the working face, with haulage ranking second and drilling third in the number of injuries to the men.

The total amount of time lost on account of the 10 deaths and 1,081 injuries that occurred during the year is estimated as 129,000 man-days. This amount is equal to 118 days per accident, or 7 days for each hundred man-shifts worked at the mines during the year.

Oklahoma, Missouri, and Kansas were the leading States in the number of men employed at lead and zinc mines in 1930, and all three of the States reduced their accident-frequency rates as compared with the preceding year. Comparative rates for the two years were as follows, the figures indicating the number of fatal and nonfatal injuries per thousand full-time or 300-day employees:

	1929	1930
Kansas	255.74	193.81
Missouri	159.23	148.80
Oklahoma	314.40	236.84

TABLE 20.—*Lead and zinc mines* [1] *(Mississippi Valley): Men employed and days worked, by States, during the year ended December 31, 1930*

State	Active operators	Men employed				Days of labor performed				Average days active			
		Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total
Illinois	7	265	72	36	373	49,837	14,297	5,400	69,534	188	199	150	186
Kansas	17	1,397	100	----	1,497	270,177	20,783	----	290,960	193	208	----	194
Kentucky	9	266	145	----	411	58,752	24,729	----	83,481	221	171	----	203
Missouri	7	2,034	204	----	2,238	576,663	58,384	----	635,047	284	286	----	284
Oklahoma	28	2,969	309	----	3,278	517,357	52,510	----	569,867	174	170	----	174
Wisconsin	5	220	97	----	317	45,365	21,553	----	66,918	206	222	----	211
Other States	4	293	110	7	410	87,304	32,627	1,085	121,016	298	297	155	295
Total, 1930	77	7,444	1,037	43	8,524	1,605,455	224,883	6,485	1,836,823	216	217	151	215
Total, 1929	85	9,755	1,371	51	11,177	2,387,306	331,791	16,690	2,735,787	245	242	327	245

[1] Includes fluorspar mines in Illinois and Kentucky.

TABLE 21.—*Lead and zinc mines* [1] *(Mississippi Valley): Number of 300-day workers and number killed and injured during the year ended December 31, 1930*

State	Number of 300-day workers				Number killed				Number injured				Widows	Orphans
	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total		
Illinois	166	48	18	232	----	----	----	----	23	9	----	32	----	----
Kansas	901	69	----	970	2	----	----	2	170	16	----	186	2	4
Kentucky	195	83	----	278	----	----	----	----	21	3	----	24	----	----
Missouri	1,922	195	----	2,117	3	----	----	3	281	31	----	312	3	2
Oklahoma	1,725	175	----	1,900	1	----	----	1	404	45	----	449	1	1
Wisconsin	151	72	----	223	----	----	----	----	48	6	----	54	----	----
Other States	291	108	4	403	3	1	----	4	19	5	----	24	6	9
Total, 1930	5,351	750	22	6,123	9	1	----	10	966	115	----	1,081	12	16
Total, 1929	7,958	1,106	55	9,119	17	2	----	19	1,965	204	4	2,173	12	31

[1] Includes fluorspar mines in Illinois and Kentucky.

NONMETALLIC MINERAL MINES

All nonmetallic mineral mines (except coal) are included in this group. The minerals produced include phosphate rock, asbestos, sulphur, gypsum, etc. The group does not include cement rock, limestone, sandstone, granite, slate, marble, or trap rock, as these seven stones are usually produced by quarrying methods and are covered by a separate annual publication dealing with stone quarries. All of the nonmetallic mines considered as a group employ about 10,000 or 12,000 men. Because of the relatively small number of employees and accidents, the mines have been included in the annual series of publications relating chiefly to metal mines.

Lower fatality and injury rates were reported in 1930 among the 10,562 men employed at the mines. This class of mines had a lower fatality rate than any of the other four classes for which separate rates are shown in this publication, and the rate for nonfatal injuries was lower than that for any other class of mines except iron-ore mines. (See Table 5.)

Seven fatalities occurred during the year, the causes of which are shown in Table 24. The number of nonfatal injuries reported was 1,283, and the principal causes of these in underground mining were loading at the working face, haulage, hand tools, and fall of roof. The main causes of injuries in opencut mining were handling materials, falls of persons, hand tools, haulage, and falls of rock.

Included in the nonfatal injuries that occurred in 1930 were 2 cases of permanent total disability, 33 of permanent partial disability, and 1,248 of temporary injuries. It is estimated that these injuries, together with the seven fatal accidents previously referred to, represent a loss of time or period of disability equal to 97,000 man-days. This loss of time represents an average of 75 days per accident and an average loss of 3 days for each hundred man-shifts worked by all employees during the year.

Mining by underground methods is not as characteristic of nonmetallic minerals as of metallic ores. Fewer men work underground than in opencut mining. The number employed in each group in the various States is shown in Table 22. It will be observed that New York is far in the lead of any other State in the number of underground workers. California ranked second, with less than half as many underground employees as New York. New York reduced its accident-frequency rate for underground accidents in 1930, but the rate for California increased. This is shown by the following figures, which indicate the number of fatalities and injuries per thousand 300-day workers underground.

	1929	1930
California	187.68	254.30
New York	152.07	144.98

The leading States in opencut mining of nonmetallic minerals, as regards the number of men employed, were Florida and Tennessee. Both of these States likewise succeeded in reducing their accident rates for opencut mines in 1930, as shown by the following figures.

	1929	1930
Florida	105.87	66.59
Tennessee	75.51	66.50

TABLE 22.—*Nonmetallic mineral mines: Men employed and days worked, by States, during the year ended December 31, 1930*

State	Active operators	Men employed				Days of labor performed				Average days active			
		Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total
California	47	325	109	178	612	87,309	28,166	34,411	149,886	269	258	193	245
Florida	9		640	925	1,565		193,238	261,242	454,480		302	282	290
Georgia	11	22	5	101	128	6,325	1,520	27,170	35,015	288	304	269	274
Iowa	8	123	39	29	191	21,025	8,789	6,876	36,690	171	225	237	192
Michigan	6	122	66	67	255	28,184	15,732	13,906	57,822	231	238	208	227
Missouri	7	44	51	71	166	5,992	15,075	16,287	37,354	136	296	229	225
New York	21	802	161	27	990	182,231	41,642	4,320	228,193	227	259	160	230
North Carolina	11	76	31	285	392	18,220	8,835	85,279	112,334	240	285	299	287
Pennsylvania	10	43	19	45	107	11,248	4,877	9,437	25,562	262	257	210	239
Tennessee	9	74	367	413	854	22,718	108,030	117,311	248,059	307	294	284	290
Texas	11	17	1,542	132	1,691	2,598	552,725	32,585	587,908	153	358	247	348
Utah	8	103	88	51	242	18,388	11,051	7,572	37,011	179	126	148	153
Virginia	10	115	487	186	788	26,375	120,360	37,724	184,459	229	247	203	234
Other States	122	1,054	502	1,025	2,581	256,371	128,066	204,954	589,391	243	255	200	228
Total, 1930	290	2,920	4,107	3,535	10,562	686,984	1,238,106	859,074	2,784,164	235	301	243	264
Total, 1929	276	3,389	4,158	3,784	11,331	860,188	1,274,520	1,014,490	3,149,198	254	307	268	278

TABLE 23.—*Nonmetallic mineral mines: Number of 300-day workers and number killed and injured during the year ended December 31, 1930*

State	Number of 300-day workers				Number killed				Number injured				Widows	Orphans
	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total		
California	291	94	115	500	1			1	73	20	34	127	1	1
Florida		644	871	1,515						52	58	110		
Georgia	21	5	91	117					5		7	12		
Iowa	70	29	23	122					9	3	2	14		
Michigan	94	53	46	193	1			1	15	3	6	24	1	
Missouri	20	50	54	124					1	22	11	34		
New York	607	139	14	760					88	7	1	96		
North Carolina	61	30	284	375					6	4	43	53		
Pennsylvania	37	16	32	85					3		2	5		
Tennessee	76	360	391	827		1		1	7	47	26	80		
Texas	9	1,842	108	1,959		1	1	2	7	202	23	232	1	
Utah	61	37	25	123					29	4	15	48		
Virginia	88	401	126	615					8	53	24	85		
Other States	855	427	683	1,965	1	1		2	205	74	84	363	2	3
Total, 1930	2,290	4,127	2,863	9,280	3	3	1	7	456	491	336	1,283	5	4
Total, 1929	2,867	4,248	3,382	10,497	16	5	3	24	532	688	544	1,764	9	20

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TABLE 24.—*All mines: Fatalities and injuries, by causes and*

NUMBER KILLED

Kind of mine	Underground								
	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
	1	2	3	4	5	6	7	8	9
Copper	23	1	1	8	8	5			2
Gold, silver, and miscellaneous metal	28	1	2	13	6	15	2		3
Iron	22	4		13	5	2			2
Lead and zinc (Mississippi Valley) [1]	6				2	1			
Nonmetallic mineral	1				1				
Total, 1930	80	6	3	34	22	23	2		7
Percentage of grand total killed	29.52	2.21	1.11	12.54	8.12	8.49	0.74		2.58
Percentage of class total killed	40.00	3.00	1.50	17.00	11.00	11.50	1.00		3.50
Number killed per thousand 300-day workers employed underground	1.40	.11	.05	.59	.38	.40	.03		.12

NUMBER INJURED

Copper	1,069	576	555	57	544	232	150	345	8
Gold, silver, and miscellaneous metal	1,107	610	596	75	492	270	87	430	10
Iron	272	318	151	19	231	52	40	129	9
Lead and zinc (Mississippi Valley) [1]	85	250	31	2	171	27	7	109	7
Nonmetallic mineral	37	118	48	4	78	5	9	29	3
Total, 1930	2,570	1,872	1,381	157	1,516	586	293	1,042	37
Percentage of grand total injured	16.48	12.00	8.86	1.01	9.72	3.76	1.88	6.68	0.24
Percentage of class total injured	21.07	15.35	11.32	1.29	12.43	4.80	2.40	8.54	.30
Number injured per thousand 300-day workers employed underground	44.84	32.66	24.10	2.74	26.45	10.22	5.11	18.18	.65

1911–1929

Fatalities, 1911 to 1929:									
Number (total United States)	2,812	126	76	924	569	628	143	32	178
Percentage of grand total	30.00	1.34	0.81	9.86	6.07	6.70	1.53	0.34	1.90
Injuries, 1911 to 1929:									
Number (total United States)	109,555	66,855	52,373	7,111	63,736	15,675	11,507	33,611	1,371
Percentage of grand total	18.11	11.05	8.66	1.17	10.54	2.59	1.90	5.56	0.23

[1] Includes fluorspar mines in Illinois and Kentucky.

kinds of mines, during the year ended December 31, 1930

NUMBER KILLED

Underground								Shaft						
Machinery (other than locomotives or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (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
10	11	12	13	14	15a	15b		16	17	18	19	20	21	
3					1	4	56	3	2			7	2	14
1	5	1	1			2	80	4	3	2		8	2	19
	1	1				2	52	2		1		1		4
							9							0
				1			3							0
4	6	2	1	1	1	8	200	9	5	3		16	4	37
1.48	2.21	0.74	0.37	0.37	0.37	2.95	73.80	3.32	1.84	1.11		5.90	1.48	13.65
2.00	3.00	1.00	.50	.50	.50	4.00	100.00	24.33	13.51	8.11		43.24	10.81	100.00
.07	.11	.03	.02	.02	.02	.14	3.49	.16	.09	.05		.28	.07	.65

NUMBER INJURED

28		11	3	85	95	603	4,361	26	80	1		34	91	232
70	4	14	2	233	218	604	4,822	5	28	1		53	37	124
57	1	1		29	97	229	1,635	5	4			10	6	25
6		3		36	30	164	928	3	14		1	15	5	38
7			1	8	34	71	452	1				1	2	4
168	5	29	6	391	474	1,671	12,198	40	126	2	1	113	141	423
108	0.03	0.18	0.04	2.51	3.04	10.71	78.22	0.26	0.81	0.01	0.01	0.72	0.90	2.71
1.38	.04	.24	.05	3.20	3.89	13.70	100.00	9.46	29.79	.47	.24	26.71	33.33	100.00
2.93	.09	.51	.11	6.82	8.27	29.16	212.84	.70	2.20	.03	.02	1.97	2.46	7.38

1911–1929

37	315	88	165	4	3	231	6,331	508	186	32	22	426	153	1,327
0.39	3.36	0.94	1.76	0.04	0.03	2.47	67.54	5.42	1.98	0.34	0.23	4.55	1.63	14.15
6,299	301	887	267	10,810	635	84,641	465,634	1,282	4,454	138	134	4,369	4,920	15,297
1.04	0.05	0.14	0.04	1.79	0.10	14.01	76.98	0.21	0.74	0.02	0.02	0.72	0.82	2.53

TABLE 24.—*All mines: Fatalities and injuries, by causes, and kinds*

NUMBER KILLED

Kind of mine	Surface										
	Mine cars, mine locomotives, or aerial trams	Railway cars and locomotives	Run or fall of ore in or from ore bins	Falls of persons	Stepping on nail	Hand tools	Electricity	Machinery	Handling materials	Other causes	Total, surface
	22	23	24	25	26	27	28	29	30a	30b	
Copper				2				1	1	2	6
Gold, silver, and miscellaneous metal	1			1			1		2	3	8
Iron	1		1	3					1		6
Lead and zinc (Mississippi Valley)				1							1
Nonmetallic mineral	1						2				3
Total, 1930	3		1	7			3	1	4	5	24
Percentage of grand total killed	1.11		0.37	2.58			1.11	0.37	1.48	1.84	8.86
Percentage of class total killed	12.50		4.17	29.16			12.50	4.17	16.67	20.83	100.00
Number killed per thousand 300-day workers employed on the surface and in the pit	.12		.04	.28			.12	.04	.16	.20	.96

NUMBER INJURED

Copper	17	17	18	94	32	61	5	33	50	191	518
Gold, silver, and miscellaneous metal	38	10	22	118	37	106	12	105	101	266	815
Iron	14	2	5	34	13	22	3	13	39	47	192
Lead and zinc (Mississippi Valley)	9	2	6	14	11	10		10	16	37	115
Nonmetallic mineral	5	13	1	43	38	59	5	54	115	158	491
Total, 1930	83	44	52	303	131	258	25	215	321	699	2,131
Percentage of grand total injured	0.53	0.28	0.33	1.95	0.84	1.66	0.16	1.38	2.06	4.48	13.67
Percentage of class total injured	3.90	2.06	2.44	14.22	6.15	12.11	1.17	10.09	15.06	32.80	100.00
Number injured per thousand 300-day workers employed on the surface and in the pit	3.34	1.77	2.09	12.20	5.27	10.38	1.01	8.65	12.92	28.13	85.76

1911–1929

Fatalities, 1911 to 1929:											
Number (total United States)	82	98	22	112	4	8	101	118		303	848
Percentage of grand total	0.87	1.05	0.23	1.20	0.04	0.09	1.08	1.26		3.23	9.05
Injuries, 1911 to 1929:											
Number (total United States)	4,699	2,429	1,494	8,692	4,963	10,969	798	8,212	341	34,881	77,478
Percentage of grand total	0.78	0.40	0.25	1.44	0.82	1.81	0.13	1.36	0.05	5.77	12.81

of mines, during the year ended December 31, 1930—Continued

NUMBER KILLED

Open pit													
Falls or slides of rock or ore	Explosives	Haulage (locomotives, etc.)	Power shovels	Falls of persons	Falls of derricks, booms, etc.	Run or fall of ore in or from ore[1] bins	Machinery (other than locomotives or power shovels)	Electricity	Hand tools	Handling materials	Other causes	Total, open pit	Grand total
31	32	33	34	35	36	37	38	39	40	41a	41b		
												0	76
2												2	109
1	4		2									7	69
												0	10
	1											1	7
3	5		2									10	271
1.11	1.84		0.74									3.69	100.00
30.00	50.00		20.00									100.00	
.28	.47		.18									.93	2.92

NUMBER INJURED

26	7	26	15	23	2		5	3	20	42	41	210	5,321
6	2	7	4	4		1	1		3	16	8	52	5,813
18	5	35	20	20	1		13		23	57	52	244	2,096
													1,061
32	12	34	18	38	4	6	27	1	35	66	63	336	1,283
82	26	102	57	85	7	7	46	4	81	181	164	842	15,594
0.53	0.17	0.65	0.37	0.55	0.04	0.04	0.29	0.03	0.52	1.16	1.05	5.40	100.00
9.74	3.09	12.11	6.77	10.10	.83	.83	5.46	.47	9.62	21.50	19.48	100.00	
7.64	2.42	9.50	5.31	7.92	.65	.65	4.28	.37	7.54	16.85	15.27	78.40	167.86

1911-1929

222	181	239	40	34	14	3	37	29	1	1	67	868	9,374
2.37	1.93	2.55	0.43	0.36	0.15	0.03	0.39	0.31	0.01	0.01	0.72	9.26	100.00
7,176	1,549	5,272	3,300	4,334	438	250	2,544	167	4,696	175	16,544	46,445	604,854
1.19	0.26	0.87	0.54	0.72	0.07	0.04	0.42	0.03	0.78	0.03	2.73	7.68	100.00

TABLE 25.—*All mines: Percentages of fatalities, by causes and kinds of mines, during the year ended December 31, 1930*

Causes	Percentage killed						
	Copper	Gold, silver, and miscellaneous metal	Iron	Lead and zinc (Mississippi Valley)	Nonmetallic mineral	Total	
						1930	1929
Underground:							
1. Fall of rock or ore from roof or wall	30.26	25.69	31.88	60.00	14.28	29.52	32.86
2. Rock or ore while loading at working face	1.32	.92	5.80			2.21	2.00
3. Hand tools	1.32	1.83				1.11	.86
4. Explosives	10.52	11.93	18.84			12.54	9.43
5. Haulage	10.52	5.51	7.24	20.00	14.28	8.12	9.14
6. Falling down chute, winze, raise, or stope	6.58	13.76	2.90	10.00		8.49	6.00
7. Run of ore from chute or pocket		1.83				.74	1.43
8. Drilling							.28
9. Electricity	2.63	2.75	2.90			2.58	1.71
10. Machinery (other than locomotives or drills)	3.95	.92				1.48	1.14
11. Mine fires		4.59	1.45			2.21	.86
12. Suffocation from natural gases		.92	1.45			.74	2.29
13. Inrush of water		.92				.37	.28
14. Stepping on nail					14.28	.37	
15a Handling materials (other than rock or ore)	1.32					.37	.86
15b Other causes	5.26	1.83	2.90			2.95	2.00
Total, underground	73.68	73.40	75.36	90.00	42.86	73.80	71.14
Shaft: [1]							
16. Falling down shaft	3.95	3.67	2.90			3.32	3.72
17. Objects falling down shaft	2.63	2.75				1.84	2.00
18. Breaking of cables		1.83	1.45			1.11	
20. Skip, cage, or bucket	9.21	7.34	1.45			5.90	5.43
21. Other causes	2.63	1.83				1.48	1.14
Total, shaft	18.42	17.43	5.80	0	0	13.65	12.29
Surface: [2]							
22. Mine cars, mine locomotives, gravity, or aerial trams		.92	1.45		14.28	1.11	.86
23. Railway cars and locomotives							.86
24. Run or fall of ore in or from ore bins			1.45			.37	
25. Falls of persons	2.63	.92	4.35	10.00		2.58	2.00
27. Hand tools							.57
28. Electricity		.92			28.57	1.11	.57
29. Machinery	1.32					.37	.86
30a. Handling materials	1.32	1.83	1.45			1.48	
30b. Other causes	2.63	2.75				1.84	3.14
Total, surface	7.90	7.34	8.70	10.00	42.86	8.86	8.86
Open pit: [3]							
31. Falls or slides of rock or ore		1.83	1.45			1.11	2.29
32. Explosives			5.80		14.28	1.84	1.43
33. Haulage							2.00
34. Power shovels			2.90			.74	.57
38. Machinery (other than locomotives or power shovels)							.28
41a. Handling materials							.28
41b. Other causes							.86
Total, open pit	0	1.83	10.14	0	14.28	3.69	7.71
Grand total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

[1] No fatalities caused by overwinding (No. 19).
[2] No fatalities caused by stepping on nail (No. 26).
[3] No fatalities caused by falls of persons (No. 35), falls of derricks, booms, etc. (No. 36), run or fall of ore in or from ore bins (No. 37), electricity (No. 39), or hand tools (No. 40).

TABLE 26.—*All mines: Percentages of injuries, by causes and kinds of mines, during the year ended December 31, 1930*

Causes	Percentage injured						
	Copper	Gold, silver, and miscellaneous metal	Iron	Lead and zinc (Mississippi Valley)	Nonmetallic mineral	Total	
						1930	1929
Underground:							
1. Fall of rock or ore from roof or wall	20.09	19.04	12.98	7.86	2.88	16.48	15.35
2. Rock or ore while loading at working face	10.83	10.49	15.17	23.13	9.20	12.00	11.38
3. Hand tools	10.43	10.25	7.20	2.87	3.74	8.86	9.69
4. Explosives	1.07	1.29	.91	.18	.31	1.01	.77
5. Haulage	10.22	8.46	11.02	15.82	6.08	9.72	11.08
6. Falling down chute, winze, raise, or stope	4.36	4.65	2.48	2.50	.39	3.76	3.64
7. Run of ore from chute or pocket	2.82	1.50	1.91	.65	.70	1.88	1.94
8. Drilling	6.48	7.40	6.15	10.08	2.26	6.68	6.45
9. Electricity	.15	.17	.43	.65	.23	.24	.16
10. Machinery	.53	1.21	2.72	.56	.55	1.08	.97
11. Mine fires		.07	.05			.03	.02
12. Suffocation from natural gases	.21	.24	.05	.28		.18	.11
13. Inrush of water	.06	.03			.08	.04	.01
14 Stepping on nail	1.60	4.01	1.38	3.33	.62	2.51	2.20
15a. Handling materials (other than rock or ore)	1.78	3.75	4.63	2.77	2.65	3.04	2.75
15b. Other causes	11.33	10.39	10.97	15.17	5.54	10.71	11.88
Total, underground	81.96	82.95	78.05	85.85	35.23	78.22	78.40
Shaft:							
16. Falling down shaft	.49	.09	.24	.28	.08	.26	.19
17. Objects falling down shaft	1.50	.48	.19	1.29		.81	.70
18. Breaking of cables	.02	.02				.01	.02
19. Overwinding				.09		.01	.02
20. Skip, cage, or bucket	.64	.91	.48	1.39	.08	.72	.66
21. Other causes	1.71	.64	.24	.46	.15	.90	.90
Total, shaft	4.36	2.14	1.15	3.51	.31	2.71	2.49
Surface:							
22. Mine cars, mine locomotives, gravity, or aerial trams	.32	.65	.67	.83	.39	.53	.87
23. Railway cars and locomotives	.32	.17	.10	.18	1.01	.28	.39
24. Run or fall of ore in or from ore bins	.34	.38	.24	.56	.08	.33	.24
25. Falls of persons	1.76	2.03	1.62	1.29	3.35	1.95	1.56
26. Stepping on nail	.60	.64	.62	1.02	2.96	.84	.77
27. Hand tools	1.15	1.82	1.05	.93	4.60	1.66	1.66
28. Electricity	.09	.21	.14		.39	.16	.08
29. Machinery	.62	1.81	.62	.93	4.21	1.38	1.16
30a. Handling materials	.94	1.74	1.86	1.48	8.96	2.06	1.48
30b. Other causes	3.59	4.57	2.24	3.42	12.32	4.48	4.42
Total, surface	9.73	14.02	9.16	10.64	38.27	13.67	12.63
Open pit:							
31. Falls or slides of rocks or ore	.49	.10	.86		2.50	.53	.76
32. Explosives	.13	.03	.24		.94	.17	.15
33. Haulage	.49	.12	1.67		2.65	.65	.69
34. Power shovels	.28	.07	.95		1.40	.37	.36
35. Falls of persons	.43	.07	.95		2.96	.55	.72
36. Falls of derricks, booms, etc	.04		.05		.31	.04	.07
37. Run or fall of ore in or from ore bins		.02			.47	.04	.05
38. Machinery (other than locomotives or power shovels)	.09	.02	.62		2.10	.29	.34
39. Electricity	.06				.08	.03	.07
40 Hand tools	.38	.05	1.10		2.73	.52	.68
41a. Handling materials	.79	.27	2.72		5.14	1.16	.76
41b. Other causes	.77	.14	2.48		4.91	1.05	1.83
Total, open pit	3.95	.89	11.64		26.19	5.40	6.48
Grand total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

TABLE 27.—*All mines: Accidents, by States and severity of injury, during the year ended December 31, 1930*

State	Killed	Permanent total [1]	Permanent partial [2]	Temporary disability, more than remainder of day of accident	Total nonfatal	Grand total
Alabama	13		53	225	278	291
Alaska	6		2	367	369	375
Arizona	20	1	53	1,327	1,381	1,401
California	29		25	1,386	1,411	1,440
Colorado	15	4	13	640	657	672
Florida			2	108	110	110
Georgia				16	16	16
Idaho	19	3	21	902	926	945
Illinois	1		1	32	33	34
Iowa			1	13	14	14
Kansas	2	1	11	262	274	276
Kentucky			7	76	83	83
Michigan	46	1	31	2,089	2,121	2,167
Minnesota	24	1	22	580	603	627
Missouri	4	1	24	381	406	410
Montana	24	1	27	1,465	1,493	1,517
Nevada	10	1	27	567	595	605
New Jersey	5	2	57	163	222	227
New Mexico	5		7	542	549	554
New York	8	2	21	712	735	743
North Carolina			3	112	115	115
Oklahoma	1		15	450	465	466
Oregon	2			47	47	49
Pennsylvania	1			24	24	25
South Dakota	7		5	340	345	352
Tennessee	7		5	134	139	146
Texas	2	1	6	275	282	284
Utah	16	2	24	1,460	1,486	1,502
Virginia	1		5	141	146	147
Washington	1		5	57	62	63
Wisconsin	2			68	68	70
Wyoming			1	18	19	19
Other States		1	7	112	120	120
Total, 1930	271	22	481	15,091	15,594	15,865

[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, 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.

TABLE. 28—*All mines: Accidents, by causes and severity of injury, during the year ended December 31, 1930*

Cause	Killed	Permanent total	Permanent partial	Temporary disability, more than remainder of day of accident	Total nonfatal	Grand total	Number of mines involved
Underground:							
1. Fall of rock or ore from roof or wall	80	6	72	2,492	2,570	2,650	366
2. Rock or ore while loading at working face	6		55	1,817	1,872	1,878	298
3. Hand tools	3	2	32	1,347	1,381	1,384	292
4. Explosives	34	9	12	136	157	191	96
5. Haulage	22	2	82	1,432	1,516	1,538	318
6. Falling down chute, winze, raise, or stope	23		13	573	586	609	176
7. Run of ore from chute or pocket	2		8	285	293	295	93
8. Drilling		1	33	1,008	1,042	1,042	260
9. Electricity	7		3	34	37	44	32
10. Machinery (other than locomotives or drills)	4		16	152	168	172	91
11. Mine fires	6			5	5	11	5
12. Suffocation from natural gases	2			29	29	31	14
13. Inrush of water	1			6	6	7	4
14. Stepping on nail	1		5	386	391	392	155
15a. Handling materials (other than rock or ore)	1		13	461	474	475	153
15b. Other causes	8		32	1,639	1,671	1,679	303
Total, underground	200	20	376	11,802	12,198	12,398	
Shaft:							
16. Falling down shaft	9		4	36	40	49	29
17. Objects falling down shaft	5		3	123	126	131	51
18. Breaking of cables	3			2	2	5	4
19. Overwinding				1	1	1	1
20. Skip, cage, or bucket	16		11	102	113	129	75
21. Other causes	4		7	134	141	145	54
Total, shaft	37	0	25	398	423	460	
Surface:							
22. Mine cars, mine locomotives, gravity, or aerial trams	3		4	79	83	86	60
23. Railway cars and locomotives			5	39	44	44	26
24. Run or fall of ore in or from ore bins	1		2	50	52	53	32
25. Falls of persons	7		4	299	303	310	150
26. Stepping on nail			3	128	131	131	64
27. Hand tools			3	255	258	258	126
28. Electricity	3			25	25	28	19
29. Machinery	1		16	199	215	216	122
30a. Handling materials	4		7	314	321	325	135
30b. Other causes	5		14	685	699	704	185
Total, surface	24	0	58	2,073	2,131	2,155	
Open pit:							
31. Falls or slides of rock or ore	3		2	80	82	85	40
32. Explosives	5	1	2	23	26	31	16
33. Haulage			2	100	102	102	43
34. Power shovels	2		3	54	57	59	27
35. Falls of persons			2	83	85	85	34
36. Falls of derricks, booms, etc				7	7	7	7
37. Run or fall of ore in or from ore bins			1	6	7	7	6
38. Machinery (other than locomotives or power shovels)			3	43	46	46	30
39. Electricity				4	4	4	3
40. Hand tools			3	78	81	81	41
41a. Handling materials			4	177	181	181	58
41b. Other causes		1		163	164	164	50
Total, open pit	10	2	22	818	842	852	
Grand total	271	22	481	15,091	15,594	15,865	

TABLE 29.—*All mines: Severity of accidents, by causes, 1926–1930, showing percentage of accidents in each class*

Cause	Killed	Permanent total	Permanent partial	Temporary disability, more than remainder of day of accident	Total nonfatal	Grand total (per cent)	Actual number	
							Killed	Injured
1. Fall of rock or ore from roof or wall	2.56	0.12	1.85	95.47	97.44	100	488	18,597
2. Rock or ore while loading at working face	.25	.01	1.93	97.81	99.75	100	33	13,047
3. Hand tools	.14	.03	1.62	98.21	99.86	100	16	11,021
4. Explosives	11.55	2.25	10.42	75.78	88.45	100	164	1,256
5. Haulage	1.12	.05	2.99	95.84	98.88	100	131	11,599
6. Falling down chute, winze, raise, or stope	3.12	.08	1.45	95.35	96.88	100	120	3,727
7. Run of ore from chute or pocket	1.34		1.93	96.73	98.66	100	27	1,994
8. Drilling	.06	.04	1.87	98.03	99.94	100	5	7,763
9. Electricity	8.54		3.35	88.11	91.46	100	28	300
10. Machinery (other than locomotives or drills)	.85		6.66	92.49	99.15	100	11	1,281
11. Mine fires	40.82		2.04	57.14	59.18	100	20	29
12. Suffocation from natural gases	12.95	.52		86.53	87.05	100	25	168
13. Inrush of water	75.64		1.28	23.08	24.36	100	59	19
14. Stepping on nail	.03		.96	99.01	99.97	100	1	2,931
15a. Handling materials (other than rock or ore)	.36		2.07	97.57	99.64	100	4	1,109
15b. Other causes	.33		1.29	98.38	99.67	100	54	16,384
Total, underground	1.28	.08	2.04	96.60	98.72	100	1,186	91,225
16. Falling down shaft	22.07		3.45	74.48	77.93	100	64	226
17. Objects falling down shaft	3.12	.36	1.32	95.20	96.88	100	26	808
18. Breaking of cables	17.24	3.45	10.34	68.97	82.76	100	5	24
19. Overwinding	3.57			96.43	96.43	100	1	27
20. Cage, skip, or bucket	9.99		4.64	85.37	90.01	100	86	775
21. Other causes	2.48		2.30	95.22	97.52	100	28	1,101
Total, shaft	6.62	.13	2.84	90.41	93.38	100	210	2,961
22. Mine cars, mine locomotives, gravity, or aerial trams	1.97	.24	3.81	93.98	98.03	100	16	798
23. Railway cars and locomotives	2.77		5.31	91.92	97.23	100	12	421
24. Run or fall of ore in or from ore bins	.69		3.13	96.18	99.31	100	2	286
25. Falls of persons	1.47	.10	1.47	96.96	98.53	100	30	2,010
26. Stepping on nail	.10	.10	1.11	98.69	99.90	100	1	994
27. Hand tools	.14		2.22	97.64	99.86	100	3	2,162
28. Electricity	16.05		1.23	82.72	83.95	100	26	136
29. Machinery	1.41	.13	7.97	90.49	98.59	100	21	1,472
30a. Handling materials	.60		1.65	97.75	99.40	100	4	662
30b. Other causes	.81	.03	1.38	97.78	99.19	100	52	6,406
Total, surface	1.08	.06	2.40	96.46	98.92	100	167	15,347
31. Falls or slides of rock or ore	3.83	.11	2.74	93.32	96.17	100	35	878
32. Explosives	9.13	1.37	7.31	82.19	90.87	100	20	199
33. Haulage	2.90	.13	6.42	90.55	97.10	100	23	771
34. Power shovels	1.89		7.01	91.10	98.11	100	7	364
35. Falls of persons	.27		1.87	97.86	99.73	100	2	746
36. Falls of derricks, booms, etc	5.00		1.25	93.75	95.00	100	4	76
37. Run or fall of ore in or from ore bins	1.52		1.51	96.97	98.48	100	1	65
38. Machinery (other than locomotives or power shovels)	.94		4.01	95.05	99.06	100	4	420
39. Electricity	7.69		6.15	86.16	92.31	100	5	60
40. Hand tools	.14		2.03	97.83	99.86	100	1	737
41a. Handling materials	.28		1.68	98.04	99.72	100	1	356
41b. Other causes	.41	.12	1.42	98.05	99.59	100	10	2,447
Total, open pit	1.56	.11	2.92	95.41	98.44	100	113	7,119
Grand total	1.42	.08	2.16	96.34	98.58	100	1,676	116,652

TABLE 30.—*All mines: Fatalities and injuries, classified by kind of mine and character of disability, during the year ended December 31, 1930*

Kind of mine	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 (other than locomotives or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15a	15b		16	17	18	19	20	21	
Killed:																								
Copper	23	1	1	8	8	5			2	3					1	4	56	3	2			7	2	14
Gold, silver, and miscellaneous metal	28	1	2	13	6	15	2		3	1	5	1	1			2	80	4	3	2		8	2	19
Iron	22	4		13	5	2			2		1	1				2	52	2		1		1		4
Lead and zinc (Mississippi Valley)	6				2	1											9							
Nonmetallic mineral	1				1									1			3							
Total	80	6	3	34	22	23	2		7	4	6	2	1	1	1	8	200	9	5	3		16	4	37
Permanent total:																								
Copper			1	2													3							
Gold, silver, and miscellaneous metal	5		1	2	1			1									10							
Iron				3													3							
Lead and zinc (Mississippi Valley)				2													2							
Nonmetallic mineral	1				1												2							
Total	6		2	9	2			1									20							
Permanent partial:																								
Copper	30	7	13	4	15	2	4	7		4						9	95	4				4	1	9
Gold, silver, and miscellaneous metal	25	27	13	7	21	7		14		5				2	2	10	133		2			3	5	10
Iron	12	11	6		27	2	2	6	1	5				3	8	9	92					1	1	2
Lead and zinc (Mississippi Valley)	5	8			16	2	1	4	2	2					1	3	44		1			3		4
Nonmetallic mineral		2		1	3		1	2							2	1	12							
Total	72	55	32	12	82	13	8	33	3	16				5	13	32	376	4	3			11	7	25

TABLE 30.—*All mines: Fatalities and injuries, classified by kind of mine and character of disability, during the year ended December 31, 1930*—Continued

Kind of mine	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 (other than locomotives or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15a	15b		16	17	18	19	20	21	
Temporary:																								
Copper	1,039	569	541	51	529	230	146	338	8	24	----	11	3	85	95	594	4,263	22	80	1	----	30	90	223
Gold, silver, and miscellaneous metal	1,077	583	582	66	470	263	87	415	10	65	4	14	2	231	216	594	4,679	5	26	1	----	50	32	114
Iron	260	307	145	16	204	50	38	123	8	52	1	1	----	26	89	220	1,540	5	4	----	----	9	5	23
Lead and zinc (Mississippi Valley)	80	242	31	----	155	25	6	105	5	4	----	3	----	36	29	161	882	3	13	----	1	12	5	34
Nonmetallic mineral	36	116	48	3	74	5	8	27	3	7	----	----	1	8	32	70	438	1	----	----	----	1	2	4
Total	2,492	1,817	1,347	136	1,432	573	285	1,008	34	152	5	29	6	386	461	1,639	11,802	36	123	2	1	102	134	398
Total:																								
Copper	1,092	577	556	65	552	237	150	345	10	31	----	11	3	85	96	607	4,417	29	82	1	----	41	93	246
Gold, silver, and miscellaneous metal	1,135	611	598	88	498	285	89	430	13	71	9	15	3	233	218	606	4,902	9	31	3	----	61	39	143
Iron	294	322	151	32	236	54	40	129	11	57	2	2	----	29	97	231	1,687	7	4	1	----	11	6	29
Lead and zinc (Mississippi Valley)	91	250	31	2	173	28	7	109	7	6	----	3	----	36	30	164	937	3	14	----	1	15	5	38
Nonmetallic mineral	38	118	48	4	79	5	9	29	3	7	----	----	1	9	34	71	455	1	----	----	----	1	2	4
Total	2,650	1,878	1,384	191	1,538	609	295	1,042	44	172	11	31	7	392	475	1,679	12,398	49	131	5	1	129	145	460

Kind of mine	Surface											Open pit													Grand total
	Mine cars, mine locomotives, or aerial trams	Railway cars and locomotives	Run or fall of ore in or from ore bins	Falls of persons	Stepping on nail	Hand tools	Electricity	Machinery	Handling materials	Other causes	Total, surface	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 or from ore bins	Machinery (other than locomotives or power shovels)	Electricity	Hand tools	Handling materials	Other causes	Total, open pit	
	22	23	24	25	26	27	28	29	30a	30b		31	32	33	34	35	36	37	38	39	40	41a	41b		
Killed:																									
Copper				2				1	1	2	6														76
Gold, silver, and miscellaneous metal	1			1			1		2	3	8	2												2	109
Iron	1		1	3					1		6	1	4		2										69
Lead and zinc (Mississippi Valley)				1							1														10
Nonmetallic mineral	1						2				3		1											1	7
Total	3		1	7			3	1	4	5	24	3	5		2									10	271
Permanent total:																									
Copper																									3
Gold, silver, and miscellaneous metal																							1	1	11
Iron													1											1	4
Lead and zinc (Mississippi Valley)																									2
Nonmetallic mineral																									2
Total													1										1	2	22
Permanent partial:																									
Copper		3	1	1	1			4		3	13		1						1						119
Gold, silver, and miscellaneous metal	3				1	2		6	2	6	20										1	1		2	165
Iron				1		1		3	1		6	1		1	2	2			1		1	2		10	110
Lead and zinc (Mississippi Valley)			1	1	1				1	2	6														54
Nonmetallic mineral	1	2		1				3	3	3	13	1	1	1	1			1	1		1	1		8	33
Total	4	5	2	4	3	3		16	7	14	58	2	2	2	3	2		1	3		3	4		22	481
Temporary:																									
Copper	17	14	17	93	31	61	5	29	50	188	505	26	6	26	15	23	2		4	3	20	42	41	208	5,199
Gold, silver, and miscellaneous metal	35	10	22	118	36	104	12	99	99	260	795	6	2	7	4	4		1	1		2	15	7	49	5,637
Iron	14	2	5	33	13	21	3	10	38	47	186	17	4	34	18	18	1		12		22	55	52	233	1,982
Lead and zinc (Mississippi Valley)	9	2	5	13	10	10		10	15	35	109														1,025
Nonmetallic mineral	4	11	1	42	38	59	5	51	112	155	478	31	11	33	17	38	4	5	26	1	34	65	63	328	1,248
Total	79	39	50	299	128	255	25	199	314	685	2,073	80	23	100	54	83	7	6	43	4	78	177	163	818	15,091
Total:																									
Copper	17	17	18	96	32	61	5	34	51	193	524	26	7	26	15	23	2		5	3	20	42	41	210	5,397
Gold, silver, and miscellaneous metal	39	10	22	119	37	106	13	105	103	269	823	8	2	7	4	4		1	1		3	16	8	54	5,922
Iron	15	2	6	37	13	22	3	13	40	47	198	19	9	35	22	20	1		13		23	57	52	251	2,165
Lead and zinc (Mississippi Valley)	9	2	6	15	11	10		10	16	37	116														1,091
Nonmetallic mineral	6	13	1	43	38	59	7	54	115	158	494	32	13	34	18	38	4	6	27	1	35	66	63	337	1,290
Total	86	44	53	310	131	258	28	216	325	704	2,155	85	31	102	59	85	7	7	46	4	81	181	164	852	15,865

TABLE 31.—*All mines: Labor and accident data, classified by severity of injuries, during the year ended December 31, 1930*

UNDERGROUND AND SHAFT

Plants that had—	Number of plants	Men employed		Days of labor performed	Killed	Permanent total	Permanent partial	Temporary disability, more than remainder of day of accident	Total	Killed and injured per thousand 300-day workers				
		Actual number	Equivalent in 300-day workers							Killed	Permanent total	Permanent partial	Temporary disability, more than remainder of day of accident	Total
No time-lost injuries	1,663	7,101	4,221	1,266,253										
Temporary injuries	461	17,572	15,244	4,573,388				3,771	3,771				247.38	247.38
Temporary and permanent partial injuries	88	12,016	11,292	3,387,535			200	1,673	1,873			17.71	148.16	165.87
Temporary, permanent partial, and permanent total injuries	11	1,201	1,113	333,823		12	37	201	250		10.78	33.25	180.59	224.62
Temporary, permanent partial, and permanent total injuries and fatalities	130	25,574	25,441	7,632,320	237	8	164	6,555	6,964	9.32	.31	6.45	257.65	273.73
Total	2,353	63,464	57,311	17,193,319	237	20	401	12,200	12,858	4.14	.35	7.00	212.87	224.36

OPEN-PIT MINES

No time-lost injuries	212	3,090	2,039	611,586										
Temporary injuries	106	5,444	4,705	1,411,408				546	546				116.05	116.05
Temporary and permanent partial injuries	17	3,058	2,977	893,344			19	222	241			6.38	74.57	80.95
Temporary, permanent partial, and permanent total injuries	1	3	1	435		1			1					
Temporary, permanent partial, and permanent total injuries and fatalities	7	1,248	1,018	305,308	10	1	3	50	64	9.82	.98	2.95	49.12	62.87
Total	343	12,843	10,740	3,222,081	10	2	22	818	852	.93	.19	2.05	76.16	79.33

SURFACE SHOPS AND YARDS

Plants that had—	Number of plants	Men employed		Days of labor performed	Killed	Permanent total	Permanent partial	Temporary disability, more than remainder of day of accident	Total	Killed and injured per thousand 300-day workers				
		Actual number	Equivalent in 300-day workers							Killed	Permanent total	Permanent partial	Temporary disability, more than remainder of day of accident	Total
No time-lost injuries	1,078	6,262	4,745	1,423,329										
Temporary injuries	344	11,723	10,896	3,268,854				1,391	1,391				127.66	127.66
Temporary and permanent partial injuries	44	5,087	5,043	1,512,937			54	348	402			10.71	69.00	79.71
Temporary, permanent partial, and permanent total injuries														
Temporary, permanent partial, and permanent total injuries and fatalities	23	3,854	4,165	1,249,462	24		4	334	362	5.76		.96	80.19	86.91
Total	1,489	26,926	24,849	7,454,582	24	0	58	2,073	2,155	.97		2.34	83.42	86.73

TOTAL

No time-lost injuries	2,953	16,453	11,004	3,301,168										
Temporary injuries	911	34,739	30,845	9,253,650				5,708	5,708				185.05	185.05
Temporary and permanent partial injuries	149	20,161	19,313	5,793,816			273	2,243	2,516			14.13	116.14	130.27
Temporary, permanent partial, and permanent total injuries	12	1,204	1,114	334,258		12	37	201	250		10.77	33.22	180.43	224.42
Temporary, permanent partial, and permanent total injuries and fatalities	160	30,676	30,624	9,187,090	271	10	171	6,939	7,391	8.85	.33	5.58	226.59	241.35
Total	4,185	103,233	92,900	27,869,982	271	22	481	15,091	15,865	2.92	.24	5.18	162.44	170.78

TABLE 32.—*All mines: Labor and accident data, classified by severity of injuries, and kind of mines, during the year ended December 31, 1930*

UNDERGROUND AND SHAFT ONLY

Plants that had—	Number of plants	Men employed		Days of labor performed	Killed	Permanent total	Permanent partial	Temporary disability, more than remainder of day of accident	Total	Killed and injured per thousand 300-day workers				
		Actual number	Equivalent in 300-day workers							Killed	Permanent total	Permanent partial	Temporary disability, more than remainder of day of accident	Total
Copper mines:														
No time-lost injuries	157	684	478	143,480										
Temporary injuries	39	2,848	2,783	834,845				927	927				333.09	333.09
Temporary and parmanent partial injuries	14	3,205	3,193	957,802			35	483	518			10.96	151.27	162.23
Temporary, permanent partial, and permanent total injuries	2	338	315	94,530		2	21	74	97		6.35	66.67	234.92	307.94
Temporary, permanent partial, and permanent total injuries and fatalities	28	11,494	11,323	3,396,870	70	1	48	3,002	3,121	6.18	.09	4.24	265.12	275.63
Total	240	18,569	18,092	5,427,527	70	3	104	4,486	4,663	3.87	.17	5.75	247.95	257.74
Gold, silver, and miscellaneous metal mines:														
No time-lost injuries	1,371	4,523	2,654	796,141										
Temporary injuries	238	5,020	4,836	1,450,802				1,632	1,632				337.47	337.47
Temporary and permanent partial injuries	28	2,101	2,166	649,755			80	651	731			36.93	300.56	337.49
Temporary, permanent partial, and permanent total injuries	3	174	155	46,603		4	1	42	47		25.81	6.45	270.97	303.23
Temporary, permanent partial, and permanent total injuries and fatalities	56	6,396	7,007	2,102,184	99	6	62	2,468	2,635	14.13	.85	8.85	352.22	376.05
Total	1,696	18,214	16,818	5,045,485	99	10	143	4,793	5,045	5.89	.60	8.50	284.99	299.98
Iron mines:														
No time-lost injuries	18	472	317	95,213										
Temporary injuries	52	4,486	3,984	1,195,142				328	328				82.33	82.33
Temporary and permanent partial injuries	16	4,387	4,028	1,208,299			42	219	261			10.43	54.37	64.80
Temporary, permanent partial, and permanent total injuries	2	128	112	33,430		2	5	36	43		17.86	44.64	321.43	383.93
Temporary, permanent partial, and permanent total injuries and fatalities	36	6,844	6,319	1,895,784	56	1	47	980	1,084	8.86	.16	7.44	155.09	171.55
Total	124	16,317	14,760	4,427,868	56	3	94	1,563	1,716	3.79	.20	6.37	105.90	116.26

Lead and zinc mines (Mississippi Valley):														
No time-lost injuries	32	789	395	118,402										
Temporary injuries	61	3,536	2,231	669,266				537	537				240.70	240.70
Temporary and permanent partial injuries	20	1,850	1,526	457,871			31	259	290			20.31	169.73	190.04
Temporary, permanent partial, and permanent total injuries	2	490	466	139,702		2	10	21	33		4.29	21.46	45.07	70.82
Temporary, permanent partial, and permanent total injuries and fatalities	7	779	734	220,214	9		7	99	115	12.26		9.54	134.88	156.68
Total	122	7,444	5,352	1,605,455	9	2	48	916	975	1.68	.38	8.97	171.18	182.21
Nonmetallic mineral mines:														
No time-lost injuries	85	633	377	113,017										
Temporary injuries	71	1,682	1,411	423,333				347	347				245.92	245.92
Temporary and permanent partial injuries	10	473	379	113,808			12	61	73			31.66	160.95	192.61
Temporary, permanent partial, and permanent total injuries	2	71	65	19,558		2		28	30		30.77		430.77	461.54
Temporary, permanent partial, and permanent total injuries and fatalities	3	61	58	17,268	3			6	9	51.72			103.45	155.17
Total	171	2,920	2,290	686,984	3	2	12	442	459	1.31	.87	5.24	193.02	200.44
All mines:														
No time-lost injuries	1,663	7,101	4,221	1,266,253										
Temporary injuries	461	17,572	15,244	4,573,388				3,771	3,771				247.38	247.38
Temporary and permanent partial injuries	88	12,016	11,292	3,387,535			200	1,673	1,873			17.71	148.16	165.87
Temporary, permanent partial, and permanent total injuries	11	1,201	1,113	333,823		12	37	201	250		10.78	33.25	180.59	224.62
Temporary, permanent partial, and permanent total injuries and fatalities	130	25,574	25,441	7,632,320	237	8	164	6,555	6,964	9.32	.31	6.45	257.65	273.73
Total	2,353	63,464	57,311	17,193,319	237	20	401	12,200	12,858	4.14	.35	7.00	212.87	224.36

ACCIDENT RATES BASED ON LENGTH OF WORKDAY

Of the total number of men employed at all mines covered by this bulletin, 62 per cent worked underground, 12 per cent worked in opencut mines, and 26 per cent worked on the surface, including shops, yards, dredging, placer mining, the extraction of sulphur, etc.

Of the total number of underground workers, 88 per cent were employed at mines that had adopted 8 hours as a standard day's work, 2 per cent of the men worked at 9-hour mines, 6 per cent at 10-hour mines, and 4 per cent at mines whose length of shift was not indicated.

This information was compiled to show not only the distribution of mine workers according to the length of their working day but to call attention to the fact that accident rates based on the number of man-hours of exposure are more nearly accurate than rates based on the number of employees or shifts with no weight given to the number of hours per shift. Accident rates for mines that worked shifts of different lengths are shown in Table 33.

As many companies do not advise the Bureau of Mines as to the number of hours constituting a standard day's work, it has not been practicable thus far in the bureau's statistical work to prepare accident rates for the entire metal-mining industry on the basis of the number of man-hours of exposure. For this reason most of the accident rates in this publication and in previous reports of the same series have been calculated on the basis of the number of employees reduced to the equivalent number of 300-day workers. This method was adopted some years ago and is an improvement over the earlier practice of calculating accident rates on the basis of the number of employees without reference either to the number of shifts worked or the length of shift.

Table 33 shows the number of men employed underground in 1930 and 1929 arranged according to the number of hours constituting a standard day's work. The figures in the table represent only those metal mines whose reports showed the number of hours constituting a standard day's work. The figures do not imply that each man worked a full shift each day; they merely indicate the number of employees at mines that had adopted the stated number of hours as a standard day's work and the number of hours of exposure to mining hazards for these employees on the assumption that each average employee worked the standard number of hours during which his mine was in operation and no more. This is perhaps as close an approximation to the true number of man-hours of exposure in the metal-mining industry as it is possible to make for the industry as a whole from available records, and it is believed that the figures are dependable enough to serve all practical purposes.

Comparative accident-frequency rates, classified by length of shift and kind of mine, are shown in Table 35. Rates are shown only for groups employing a reasonably large number of men. The rates presented in the table relate to 8-hour men at all classes of mines, to 9-hour men at lead and zinc mines and nonmetallic-mineral mines, and to 10-hour men at nonmetallic-mineral mines only. The number of men employed in each of these groups is shown in Table 34. Similar figures on number of men employed in opencut mining and at surface shops are given in Table 36.

TABLE 33.—*Labor and accident data classified by length of shift, during the years ended December 31, 1930 and 1929*

UNDERGROUND AND SHAFT ONLY

Length of shift	Number of plants	Men employed		Days of labor performed	Total hours	Average days per man	Average hours per man	Killed	Permanent total	Permanent partial	Temporary disability more than remainder of day of accident	Total nonfatal	Total fatal and nonfatal
		Actual number	Equivalent in 300-day workers										
1930 [1]													
8 hours	1,385	55,174	51,126	15,337,879	122,703,032	278	2,224	209	19	337	11,489	11,845	12,054
9 hours	32	1,226	1,075	322,484	2,902,356	263	2,367	4	1	7	194	202	206
10 hours	37	3,687	3,017	904,951	9,049,510	245	2,454	10	----	48	253	301	311
All other and not stated	808	2,755	1,714	514,324	----------	187	-----	9	----	9	222	231	240
Total	2,262	62,842	56,932	17,079,638	----------	272	-----	232	20	401	12,158	12,579	12,811
1929 [1]													
8 hours	1,440	66,838	66,548	19,964,500	159,716,000	299	2,390	255	12	296	17,268	17,576	17,831
9 hours	27	1,211	1,096	328,671	2,958,039	271	2,443	6	----	3	200	203	209
10 hours	38	4,169	3,746	1,123,760	11,237,600	270	2,696	17	3	33	524	560	577
All other and not stated	649	2,308	1,554	466,300	----------	202	-----	7	----	6	284	290	297
Total	2,154	74,526	72,944	21,883,231	----------	294	-----	285	15	338	18,276	18,629	18,914

[1] All placer mines omitted.

TABLE 34.—*Labor and accident data classified by length of shift and kind of mine during the years ended December 31, 1930, 1929, and 1928*

UNDERGROUND AND SHAFT ONLY

Kind of mine	8-hour workers					9-hour workers					10-hour workers					All other and not stated			
	Men employed	Days of labor performed	Total hours	Number killed	Number injured	Men employed	Days of labor performd	Total hours	Number killed	Number injured	Men employed	Days of labor performed	Total hours	Number killed	Number injured	Men employed	Days of labor performed	Number killed	Number injured
1930 [1]																			
Copper	18,337	5,384,473	43,075,784	70	4,591						2	60	600			230	42,994		2
Gold, silver, and miscellaneous metal	15,753	4,620,666	36,965,328	88	4,743	201	53,003	477,027	1	57	33	7,988	79,880		2	1,605	250,147	5	102
Iron	12,463	3,457,156	27,657,248	43	1,322	308	89,320	803,880	3	38	3,155	770,671	7,706,710	8	206	391	110,721	2	94
Lead and zinc (Mississippi Valley)	6,911	1,472,522	11,780,176	6	900	259	62,964	566,676		45	50	15,000	150,000	1	6	224	54,969	2	15
Nonmetallic mineral	1,710	403,062	3,224,496	2	289	458	117,197	1,054,773		62	447	111,232	1,112,320	1	87	305	55,493		18
Total	55,174	15,337,879	122,703,032	209	11,845	1,226	322,484	2,902,356	4	202	3,687	904,951	9,049,510	10	301	2,755	514,324	9	231
1929 [1]																			
Copper	24,971	7,953,979	63,631,832	107	7,607											268	62,512	1	18
Gold, silver, and miscellaneous metal	19,300	5,912,390	47,299,120	83	6,650	163	49,131	442,179		44	50	11,475	114,750		2	1,187	189,299	3	79
Iron	11,612	3,411,526	27,292,208	42	1,187	24	5,695	51,255		1	3,466	936,794	9,367,940	15	455	341	102,936	1	89
Lead and zinc (Mississippi Valley)	8,960	2,190,615	17,524,920	14	1,816	536	138,520	1,246,680	3	86						223	47,163		54
Nonmetallic mineral	1,995	495,990	3,967,920	9	316	488	135,325	1,217,925	3	72	653	175,491	1,754,910	2	103	289	64,390	2	50
Total	66,838	19,964,500	159,716,000	255	17,576	1,211	328,671	2,958,039	6	203	4,169	1,123,760	11,237,600	17	560	2,308	466,300	7	290
1928 [1]																			
Copper	19,538	6,301,861	50,414,888	89	6,059											276	56,589	1	28
Gold, silver, and miscellaneous metal	19,097	5,928,497	47,427,976	62	6,853	191	61,324	551,916	1	28	321	100,223	1,002,230	2	100	1,189	205,560	2	76
Iron	12,326	3,437,766	27,502,128	33	1,435	115	32,644	293,796		57	2,147	432,573	4,325,730	11	330	2,026	623,329	3	133
Lead and zinc (Mississippi Valley)	8,065	2,015,208	16,121,664	13	2,097	537	153,556	1,382,004		129						131	37,385		14
Nonmetallic mineral	2,271	595,685	4,765,480	8	399	546	143,254	1,289,286		105	578	162,767	1,627,670	1	131	216	48,667		46
Total	61,297	18,279,017	146,232,136	205	16,843	1,389	390,778	3,517,002	1	319	3,046	695,563	6,955,630	14	561	3,838	971,530	6	297

[1] All placer mines omitted.

TABLE 35.—*Fatalities and injuries per million hours of exposure, classified by length of shift, during the years ended December 31, 1928, 1929, and 1930*

UNDERGROUND AND SHAFT ONLY

Character of disability	1928 [1]			1929 [1]			1930 [1]		
	8 hours	9 hours	10 hours	8 hours	9 hours	10 hours	8 hours	9 hours	10 hours
Fatal	1.402	0.284	2.013	1.597	2.028	1.513	1.703	1.378	1.105
Permanent total disability	.096	.284	.....	.075	.....	.267	.155	.345	.....
Permanent partial disability	2.660	.568	3.882	1.853	1.015	2.937	2.746	2.412	5.304
Temporary	112,424	89.950	76.772	108.117	67.612	46.629	93.633	66.842	27.957
Total injuries	115.180	90.702	80.654	110.045	68.627	49.833	96.534	69.599	33.261
Total fatalities and injuries	116.582	90.986	82.667	111.642	70.655	51.345	98.237	70.977	34.366
KILLED									
Kind of mine:									
Copper	1.765	.....	.....	1.682	.....	.....	1.625	.....	.....
Gold, silver, and miscellaneous metal	1.307	1.812	1.996	1.755	.....	.....	2.381	.....	.....
Iron	1.200	.....	2.543	1.539	.....	1.556	1.555	.....	.....
Lead and zinc (Mississippi Valley)	.806	.....	.....	.799	2.406	.....	.509	.....	.....
Nonmetallic mineral	1.679	.....	.614	2.268	2.463	1.140	.620	.....	0.899
Total	1.402	0.284	2.013	1.597	2.028	1.513	1.703	1.378	1.105
INJURED									
Copper	120.183	.....	.....	119.547	.....	.....	106.580	.....	.....
Gold, silver, and miscellaneous metal	144.493	50.732	99.777	140.595	99.507	17.429	128.309	.....	.....
Iron	52.178	.....	76.288	43.492	.....	47.209	47.799	.....	.....
Lead and zinc (Mississippi Valley)	130.073	93.343	.....	103.624	68.983	.....	76.400	79.410	.....
Nonmetallic mineral	83.727	81.440	80.483	79.639	59.117	58.692	89.626	58.780	78.215
Total	115.180	90.702	80.654	110.045	68.627	49.833	96.534	69.599	33.261

[1] All placer mines omitted. Basic figures shown in Tables 33 and 34.

TABLE 36.—*All mines: Number of men employed, classified by length of shift and kind of mine during the year ended December 31, 1930*

Kind of mine	Underground							Surface						
	8 hours	9 hours	10 hours	11 hours	12 hours	All other	Total	8 hours	9 hours	10 hours	11 hours	12 hours	All other	Total
Copper	18,337	.....	.....	2	.....	230	18,569	4,588	2,057	85	.....	.....	408	7,138
Gold, silver, and miscellaneous metal	15,993	204	33	.....	.....	1,984	18,214	4,807	149	101	.....	7	2,958	8,022
Iron	12,463	308	3,155	.....	.....	391	16,317	544	1,597	1,925	.....	.....	2,556	6,622
Lead and zinc (Mississippi Valley)	6,911	259	50	.....	.....	224	7,444	711	24	132	.....	2	168	1,037
Nonmetallic mineral	1,710	458	447	.....	.....	305	2,920	1,776	285	1,200	18	155	673	4,107
Total	55,414	1,229	3,685	2	.....	3,134	63,464	12,426	4,112	3,443	18	164	6,763	26,926

Kind of mine	Open pit							Total						
	8 hours	9 hours	10 hours	11 hours	12 hours	All other	Total	8 hours	9 hours	10 hours	11 hours	12 hours	All other	Total
Copper	1,971	.....	.....	.....	.....	14	1,985	24,896	2,057	85	2	.....	652	27,692
Gold, silver, and miscellaneous metal	221	61	438	.....	.....	89	809	21,021	414	572	.....	7	5,031	27,045
Iron	96	128	6,117	.....	.....	130	6,471	13,103	2,033	11,197	.....	.....	3,077	29,410
Lead and zinc (Mississippi Valley)	36	7	.....	.....	.....	.....	43	7,658	290	182	.....	2	392	8,524
Nonmetallic mineral	379	333	1,937	30	204	652	3,535	3,865	1,076	3,584	48	359	1,630	10,562
Total	2,703	529	8,492	30	204	885	12,843	70,543	5,870	15,620	50	368	10,782	103,233

SIZE OF MINE AND PERIOD OF OPERATION

During the calendar year 1930 approximately 89 per cent of all men who worked underground at metal mines were employed at mines having 25 or more men working underground. These larger mines were only 19 per cent of the total number of all underground mines, but they accounted for 92 per cent of the total number of man-days of work underground at all mines during the year.

In normal times underground mining is almost an all-year-round industry. In 1929, for example, 72 per cent of all underground workers were employed at mines that were in operation 300 or more days. In 1930, however, employees at mines that were active this length of time comprised only 50 per cent of the total number of underground employees at all mines. Twenty-nine per cent of the employees worked at mines that were in operation between 250 and 299 days. The remaining 21 per cent of the men averaged less than 250 days of work during the year.

Large mines which are in operation continuously usually have better safety records than small mines which are not worked continuously. Moreover, for any given class of mines, graded according to number of men employed, those which most closely approach a full year's operation usually have the best safety record, and for any given period of operation the larger mines usually have fewer accidents in proportion to the number of men employed. Statistics show some exceptions to these statements, but the industry's record over a period of years amply supports the statements made. Most of the apparent exceptions to the general rule relate to nonfatal injuries; it is believed that these exceptions are more apparent than real, because it is probable that the low injury rates for very small mines are due to some extent at least to the operators' failure to report all of the minor injuries that actually occur. This failure may be attributed to the facts that the mines are too small to come within the scope of the State compensation laws which require the reporting of accidents and that minor injuries may be forgotten when they occur at mines to which the State compensation laws do not apply. On the other hand, fatal accidents are not easily forgotten, and they are probably reported completely even by operators of small mines. It is significant in this connection that the fatality rates are usually higher for smaller mining operations.

Accident rates, classified according to size of mine as indicated by the number of men employed underground and by the number of days the mines were in operation, are presented in Tables 37 to 42.

TABLE 37.—*Accident rates per thousand 300-day workers, at mines employing less than 10 men, during the year ended December 31, 1930* [1]

UNDERGROUND AND SHAFT ONLY

Size of plant (number of men)	Number of plants	Men employed		Days of labor performed	Average days active	Killed	Injured	Killed per thousand 300-day workers	Injured per thousand 300-day workers
		Actual number	Equivalent in 300-day workers						
1 man	559	559	183	54,998	98	-------	5	-------	27.32
2 men	449	898	425	127,603	142	4	28	9.41	65.88
3 men	257	771	403	120,772	157	2	29	4.96	71.96
4 men	125	500	319	95,594	191	2	39	6.27	122.26
5 men	81	405	253	75,816	187	1	30	3.95	118.58
6 men	67	402	300	89,901	224	1	57	3.33	190.00
7 men	32	224	183	55,010	246	5	42	27.32	229.51
8 men	33	264	192	57,658	218	2	41	10.42	213.54
9 men	22	198	141	42,240	213	-------	28	-------	198.58
Total, 1 to 9 men	1,625	4,221	2,399	719,592	170	17	299	7.09	124.64
All others	637	58,621	54,533	16,360,046	279	215	12,280	3.94	225.18
Grand total	2,262	62,842	56,932	17,079,638	272	232	12,579	4.08	220.95

[1] All placer mines omitted.

TABLE 38.—*Accident rates per thousand 300-day workers, based on size of operations, during the year ended December 31, 1930*

UNDERGROUND AND SHAFT ONLY

Size of plant (number of men)	1930 [1]									1929 [1]	
	Number of plants	Men employed		Days of labor performed	Average days active	Killed	Injured	Killed per thousand 300-day workers	Injured per thousand 300-day workers	Killed per thousand 300-day workers	Injured per thousand 300-day workers
		Actual number	Equivalent in 300-day workers								
1 to 4	1,390	2,728	1,330	398,967	146	8	101	6.02	75.94	1.57	60.30
5 to 9	235	1,493	1,069	320,625	215	9	198	8.42	185.22	6.98	178.88
1 to 9	1,625	4,221	2,399	719,592	170	17	299	7.09	124.64	4.13	116.38
10 to 14	107	1,217	959	287,619	236	8	169	8.34	176.23	5.04	225.02
15 to 19	61	1,012	812	243,802	241	2	205	2.46	252.46	10.94	226.56
10 to 19	168	2,229	1,771	531,421	238	10	374	5.65	211.18	7.10	225.56
20 to 24	30	658	651	195,410	297	4	129	6.14	198.16	9.86	191.12
Total, 1 to 24	1,823	7,108	4,821	1,446,423	203	31	802	6.43	166.36	6.12	167.82
25 to 49	131	4,725	3,991	1,197,258	253	17	1,080	4.26	270.61	5.90	264.07
50 to 99	164	11,370	9,571	2,871,400	253	38	2,064	3.97	215.65	3.15	244.44
100 to 199	78	11,006	10,034	3,010,045	273	45	2,220	4.48	221.25	4.45	274.01
200 to 299	22	5,276	5,360	1,608,109	305	25	1,175	4.66	219.22	3.62	182.10
300 or more	44	23,357	23,155	6,946,403	297	76	5,238	3.28	226.21	3.44	279.97
Total, 25 or more	439	55,734	52,111	15,633,215	280	201	11,777	3.86	226.00	3.74	261.92
Grand total	2,262	62,842	56,932	17,079,638	272	232	12,579	4.08	220.95	3.91	255.39

[1] All placer mines omitted.

TABLE 39.—*Men employed and number killed and injured per thousand 300-day workers [1] in mines employing 1 to 4 men and those employing 5 to 9 men during the years 1922 to 1930*

UNDERGROUND AND SHAFT ONLY

Year	1 to 4 men				5 to 9 men			
	Number of plants	Men employed	Rate		Number of plants	Men employed	Rate	
			Killed	Injured			Killed	Injured
1922 [2]	969	1,875	1.01	43	149	967	8.94	124
1923 [3]	1,074	2,016	6.52	87	164	1,067	5.83	82
1924 [3]	1,208	2,294	5.34	76	210	1,354	5.52	110
1925 [3]	1,057	2,052	1.75	88	220	1,408	4.58	102
1926 [4]	1,018	1,956	5.46	77	182	1,174	4.31	112
1927 [4]	1,005	1,971	2.79	84	181	1,182	4.56	112
1928 [5]	1,332	2,660	2.81	63	232	1,481	1.70	136
1929 [5]	1,211	2,482	1.57	60	249	1,587	6.98	179
1930 [5]	1,390	2,728	6.02	76	235	1,493	8.42	185

Year	1 to 9 men				All mines			
	Number of plants	Men employed	Rate		Number of plants	Men employed	Rate	
			Killed	Injured			Killed	Injured
1922 [2]	1,118	2,842	4.51	79	1,672	58,569	4.23	351
1923 [3]	1,238	3,083	6.21	84	1,871	68,440	3.89	366
1924 [3]	1,418	3,648	5.42	91	2,079	72,903	4.73	370
1925 [3]	1,277	3,460	3.13	94	2,003	76,846	4.01	365
1926 [4]	1,200	3,130	4.93	93	1,936	72,956	4.54	286
1927 [4]	1,186	3,153	3.58	97	1,846	67,560	4.05	265
1928 [5]	1,564	4,141	2.31	96	2,277	69,570	3.33	266
1929 [5]	1,460	4,069	4.13	116	2,154	74,526	3.91	255
1930 [5]	1,625	4,221	7.09	125	2,262	62,842	4.08	221

[1] For number of 300-day workers see Table 38 and similar tables in previous reports.
[2] Alaska, California, and all placer mines omitted.
[3] Alaska and all placer mines omitted.
[4] Alaska, Utah, and all placer mines omitted.
[5] All placer mines omitted.

TABLE 40.—*Accident data, based on average number of days mines were operated during the year ended December 31, 1930*

UNDERGROUND AND SHAFT ONLY

Average number of days active	1930 [1]									1929 [1]	
	Number of plants	Men employed			Days of labor performed	Number killed	Number injured	Killed per thousand 300-day workers	Injured per thousand 300-day workers	Killed per thousand 300-day workers	Injured per thousand 300-day workers
		Actual number	Equivalent in 300-day workers	Average employees per plant							
314 days and more	239	11,972	13,761	50	4,128,334	73	4,316	5.30	313.64	4.33	302.77
300 to 313 days	265	19,172	19,461	72	5,838,148	68	3,936	3.49	202.25	3.51	241.48
250 to 299 days	217	17,924	16,653	83	4,995,967	51	2,938	3.06	176.42	4.18	163.47
200 to 249 days	198	3,788	2,892	19	867,738	24	423	8.30	146.27	4.05	288.07
150 to 199 days	296	4,635	2,698	16	809,445	11	643	4.08	238.32	4.10	212.47
100 to 149 days	427	2,031	802	5	240,560	4	138	4.99	172.07	.....	197.24
50 to 99 days	422	2,263	538	5	161,404	.....	157	.....	291.82	2.46	162.16
Less than 50 days	198	1,057	127	5	38,042	1	28	7.87	220.47	15.87	206.35
Total	2,262	62,842	56,932	28	17,079,638	232	12,579	4.08	220.95	3.91	255.39

[1] All placer mines omitted.

TABLE 41.—*Labor and accident data, classified by size of mine and number of shifts worked during the year ended December 31, 1930* [1]

UNDERGROUND AND SHAFT ONLY

Number of man-shifts	Number of men employed					Number of 300-day workers				
	1 to 24	25 to 99	Total 1 to 99	100 or more	Grand total	1 to 24	25 to 99	Total 1 to 99	100 or more	Grand total
1 to 9,999	7,108	4,195	11,303	368	11,671	4,822	2,059	6,881	82	6,963
10,000 to 24,999		9,974	9,974	1,295	11,269		9,456	9,456	717	10,173
25,000 to 49,999		1,926	1,926	6,171	8,097		2,047	2,047	5,783	7,830
50,000 to 99,999				9,466	9,466				9,661	9,661
100,000 or more				22,339	22,339				22,305	22,305
Total	7,108	16,095	23,203	39,639	62,842	4,822	13,562	18,384	38,548	56,932

Number of man-shifts	Number of man-shifts worked				
	1 to 24 men	25 to 99 men	Total 1 to 99 men	100 men or more	Grand total
1 to 9,999	1,446,423	617,772	2,064,195	24,736	2,088,931
10,000 to 24,999		2,836,691	2,836,691	215,048	3,051,739
25,000 to 49,999		614,195	614,195	1,734,891	2,349,086
50,000 to 99,999				2,898,365	2,898,365
100,000 or more				6,691,517	6,691,517
Total	1,446,423	4,068,658	5,515,081	11,564,557	17,079,638

Number of man-shifts	Number killed					Number injured				
	1 to 24 men	25 to 99 men	Total 1 to 99 men	100 men or more	Grand total	1 to 24 men	25 to 99 men	Total 1 to 99 men	100 men or more	Grand total
1 to 9,999	31	7	38		38	802	563	1,365	39	1,404
10,000 to 24,999		39	39	2	41		2,025	2,025	165	2,190
25,000 to 49,999		9	9	28	37		556	556	1,104	1,660
50,000 to 99,999				45	45				2,257	2,257
100,000 or more				71	71				5,068	5,068
Total	31	55	86	146	232	802	3,144	3,946	8,633	12,579

Number of man-shifts	Killed per thousand 300-day workers					Injured per thousand 300-day workers				
	1 to 24 men	25 to 99 men	Total 1 to 99 men	100 men or more	Grand total	1 to 24 men	25 to 99 men	Total 1 to 99 men	100 men or more	Grand total
1 to 9,999	6.43	3.40	5.52		5.46	166.32	273.43	198.37	475.61	201.64
10,000 to 24,999		4.12	4.12	2.79	4.03		214.15	214.15	230.13	215.28
25,000 to 49,999		4.40	4.40	4.84	4.73		271.62	271.62	190.90	212.01
50,000 to 99,999				4.66	4.66				233.62	233.62
100,000 or more				3.18	3.18				227.21	227.21
Total	6.43	4.06	4.68	3.79	4.08	166.32	231.82	214.64	223.95	220.95

[1] All placer mines omitted.

TABLE 42.—*Labor and accident data, classified by kind of mine*

OPEN-PIT MINES ONLY

Kind of mine	Number of plants	Men employed		Days of labor performed	Number killed	Number injured	Average days active	Rate per thousand 300-day workers	
		Actual number	Equivalent in 300-day workers					Killed	Injured
1930									
Copper	17	1,985	2,226	667,786	.....	210	336	.....	94.34
Gold, silver, and miscellaneous metal	81	809	562	168,453	2	52	208	3.56	92.53
Iron	68	6,471	5,067	1,520,283	7	244	235	1.38	48.15
Lead and zinc (Mississippi Valley)	2	43	22	6,485	.....	.....	151	.....	.....
Nonmetallic mineral	175	3,535	2,863	859,074	1	336	243	.35	117.36
Total	343	12,843	10,740	3,222,081	10	842	251	0.93	78.40
1929									
Copper	17	3,276	3,812	1,143,664	4	483	349	1.05	126.71
Gold, silver, and miscellaneous metal	97	910	673	201,747	1	55	222	1.49	81.72
Iron	69	6,116	5,633	1,689,840	19	411	276	3.37	72.96
Lead and zinc (Mississippi Valley)	2	51	55	16,690	.....	4	327	.....	72.73
Nonmetallic mineral	165	3,784	3,382	1,014,490	3	544	268	.89	160.85
Total	350	14,137	13,555	4,066,431	27	1,497	288	1.99	110.44

ACCIDENTS CLASSIFIED BY MINING METHODS

The classification of mining methods as used in this bulletin is that prepared by the mining division of the Bureau of Mines and used by that division in its studies of the relative efficiency of various mining methods from the viewpoint of productivity and costs. The classification was used in this series of statistical bulletins for the first time in the bulletin covering the calendar year 1929; it is as follows:

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.
8. Opencut with power shovel.
9. Opencut with power scraper.
10. Opencut, hand loading only.
11. Hydraulicking.
12. Dredging.

From the point of view of the numerous companies and States represented and the number of men employed in the mines, the most widely used operating method in metal mines in the United States is the open-stope method, including room-and-pillar and sublevel stoping. Next in importance in number of persons employed is the square-set method. Ranking next among underground methods of mining are top slicing, shrinkage, block caving, cut and fill, and sublevel caving.

The accident hazard to men working in mines is not the same for all of these methods of operation. Figures for 1930 and the two previous years show that the accident-frequency rate for sublevel

caving was lower and therefore more favorable than that for any other system of underground mining. Top slicing ranked next, having the second best record in number of men injured by accidents for any given number of employees. The highest accident-frequency rate was that for mines using square-sets. Between these two extremes—sublevel caving and the square-set method—came top slicing, block caving, cut and fill, open stopes, and shrinkage, in ascending order of their respective accident-frequency rates.

It should be stated in this connection that a mining company is not free to choose any method of mining that the officials of the company may prefer; it is not free 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 a price that is economically sound.

Table 44 shows the number of employees in mines using each of the various methods and the comparative accident-frequency rates of these mines both for fatalities and nonfatal lost-time injuries. In compiling these tables each mine was classified according to its principal mining method, as shown in the company's report to the Bureau of Mines. Tables 45 to 47 show the various causes of accidents for each method of operation.

Taking the figures for sublevel caving and those for square-sets as representing the two extremes on the scale of accident-frequency rates of the various methods shown in Table 46 the records show only about one injury from falls of roof in mines using sublevel caving to four injuries from the same cause in square-set mines. In loading ore seven injuries occurred in square-set mines to one in sublevel-caving mines. Injuries from haulage accidents occurred six times as often in square-set mines as in mines using sublevel caving. For falls of persons the ratio was about 1 for sublevel caving to 8 for square-sets.

Among opencut mines, those operated with power shovels are by far the most important. Comparative accident rates for the several classes of opencut mines are given in Tables 44 to 49.

TABLE 43.—*Operators* [1] *reports, grouped by mining methods*

Method of mining	Number of operators		Method of mining	Number of operators	
	1929	1930		1929	1930
Open-stope including room-and-pillar and sublevel stoping	176	162	Opencut with power shovel	58	57
Shrinkage	40	40	Opencut with power scraper	1	2
Cut and fill	25	21	Opencut, hand loading only	16	10
Square-set	51	36	Hydraulicking	5	4
Block caving	11	13	Dredging	----	1
Sublevel caving	13	12	Total	416	381
Top slicing	20	23			

[1] Placer mines not included.

TABLE 44.—*Summary of metal-mine accident data, grouped by mining methods during the year ended December 31, 1930, for selected companies* [1]

Method of mining	Number companies represented	Number States represented	Days active	Total days of labor	Men employed	300-day workers	Killed		Injured	
							Total	Per thousand 300-day workers	Total	Per thousand 300-day workers
Open-stope including room-and-pillar and sublevel stoping	162	31	255	5,268,579	20,627	17,562	66	3.76	4,201	239.21
Shrinkage	40	14	298	1,405,221	4,714	4,684	28	5.98	1,526	325.79
Cut and fill	21	8	296	1,131,694	3,824	3,772	13	3.45	693	183.72
Square-set	36	8	309	3,117,142	10,074	10,390	40	3.85	3,465	333.49
Block caving	13	7	299	1,191,311	3,978	3,971	10	2.52	679	170.99
Sublevel caving	12	4	278	834,042	3,002	2,780	11	3.96	179	64.39
Top slicing	23	5	283	1,998,513	7,060	6,662	22	3.30	493	74.00
Opencut with power shovel	57	18	256	2,510,664	9,793	8,369	8	.96	585	69.90
Opencut with power scraper	2	2	340	100,290	295	334	------	------	36	107.78
Opencut, hand loading only	10	9	235	133,076	567	444	------	------	75	168.92
Hydraulicking	4	1	267	108,244	406	361	------	------	25	69.25
Dredging	1	1	310	16,120	52	54	------	------	7	129.63
Total, 1930	381	------	277	17,814,896	64,392	59,383	198	3.33	11,964	201.47
Total, 1929	416	------	301	23,346,258	77,497	77,821	272	3.50	18,559	238.48

[1] Underground and open pit only. No reports used where less than 25 men were employed.

TABLE 45.—*Fatalities, classified by principal causes and mining methods, during the years ended December 31, 1930 and 1929, for selected companies* [1]

Method of mining [2]	By falls of rock: 1 and 31 [3]			By run or fall of ore while loading: 2, 7, and 37			By explosives: 4 and 32			By haulage: 5 and 33			By falls of persons: 6 and 35			Miscellaneous: 3, 8, 9, 10, 11, 12, 13, 14, 15, 34, 36, 38, 39, 40, and 41			In shaft: 16, 17, 18, 19, 20, and 21			Total	
	Number	Per cent of total	Rate per thousand 300-day workers	Number	Per cent of total	Rate per thousand 300-day workers	Number	Per cent of total	Rate per thousand 300-day workers	Number	Per cent of total	Rate per thousand 300-day workers	Number	Per cent of total	Rate per thousand 300-day workers	Number	Per cent of total	Rate per thousand 300-day workers	Number	Per cent of total	Rate per thousand 300-day workers	Number	Rate per thousand 300-day workers
1930																							
Open-stope including room-and-pillar and sublevel stoping	27	40.91	1.54	2	3.03	0.11	11	16.67	0.63	7	10.61	0.40	3	4.54	0.17	7	10.61	0.40	9	13.63	0.51	66	3.76
Shrinkage	12	42.86	2.56	1	3.57	.22	1	3.57	.22	2	7.14	.42	2	7.14	.42	1	3.57	.22	9	32.15	1.92	28	5.98
Cut and fill	2	15.38	.53	----	----	----	2	15.38	.53	----	----	----	3	23.08	.80	3	23.08	.80	3	23.08	.80	13	3.45
Square-set	16	40.00	1.54	----	----	----	5	12.50	.48	6	15.00	.57	4	10.00	.39	4	10.00	.39	5	12.50	.48	40	3.85
Block caving	3	30.00	.76	1	10.00	.25	----	----	----	2	20.00	.50	----	----	----	2	20.00	.50	2	20.00	.50	10	2.52
Sublevel caving	----	----	----	1	9.09	.36	3	27.27	1.08	----	----	----	1	9.09	.36	3	27.27	1.08	3	27.27	1.08	11	3.96
Top slicing	12	54.55	1.80	3	13.64	.45	4	18.18	.60	1	4.54	.15	----	----	----	2	9.09	.30	----	----	----	22	3.30
Opencut with power shovel	1	12.50	.12	----	----	----	5	62.50	.60	----	----	----	----	----	----	2	25.00	.24	----	----	----	8	.96
Total, 1930	73	36.87	1.23	8	3.53	.12	31	15.66	.52	18	9.09	.30	13	7.07	.24	24	12.12	.40	31	15.66	.52	198	3.33
1929																							
Open-stope including room-and-pillar and sublevel stoping	28	41.79	1.36	3	4.48	0.15	7	10.45	0.34	7	10.45	0.34	4	5.97	0.19	8	11.94	0.39	10	14.92	0.49	67	3.26
Shrinkage	11	33.34	1.79	3	9.09	.49	2	6.06	.33	5	15.15	.81	5	15.15	.81	----	----	----	7	21.21	1.14	33	5.37
Cut and fill	7	35.00	1.43	----	----	----	8	40.00	1.63	1	5.00	.21	1	5.00	.21	1	5.00	.21	2	10.00	.40	20	4.09
Square-set	34	47.22	1.84	2	2.78	.11	4	5.55	.22	9	12.50	.49	4	5.55	.22	5	6.95	.27	14	19.45	.76	72	3.91
Block caving	6	24.00	1.16	1	4.00	.19	3	12.00	.58	8	32.00	1.54	1	4.00	.19	4	16.00	.77	2	8.00	.38	25	4.81
Sublevel caving	5	45.46	1.09	1	9.09	.22	----	----	----	----	----	----	----	----	----	3	27.27	.65	2	18.18	.43	11	2.39
Top slicing	9	47.37	1.49	----	----	----	3	15.79	.50	1	5.26	.17	3	15.79	.50	2	10.53	.33	1	5.26	.17	19	3.15
Opencut with power shovel	6	26.09	.57	----	----	----	5	21.74	.47	7	30.43	.67	----	----	----	5	21.74	.47	----	----	----	23	2.18
Opencut, hand loading only	1	50.00	1.23	----	----	----	----	----	----	----	----	----	----	----	----	1	50.00	1.23	----	----	----	2	2.45
Total, 1929	107	39.34	1.38	10	3.68	.13	32	11.76	.41	38	13.97	.49	18	6.62	.23	29	10.66	.37	38	13.97	.49	272	3.50

[1] Underground and open pit only. No reports used where less than 25 men were employed.

[2] No fatalities for opencut with power scraper, opencut hand loading only, hydraulicking, and dredging in 1930, no fatalities for opencut with power scraper, hydraulicking, and dredging in 1929.

[3] Cause numbers refer to causes as shown in Table 24 and other similar tables.

TABLE 46.—*Injuries, classified by principal causes and mining methods, during the years ended December 31, 1930 and 1929, for selected companies* [1]

Method of mining	By falls of rock: 1 and 31 [2]			By run or fall of ore while loading: 2, 7, and 37			By explosives: 4 and 32			By haulage: 5 and 33			By falls of persons: 6 and 35			Miscellaneous: 3, 8, 9, 10, 11, 12, 13, 14, 15, 34, 36, 38, 39, 40, and 41			In shaft: 16, 17, 18, 19, 20, and 21			Total	
	Number	Per cent of total	Rate per thousand 300-day workers	Number	Per cent of total	Rate per thousand 300-day workers	Number	Per cent of total	Rate per thousand 300-day workers	Number	Per cent of total	Rate per thousand 300-day workers	Number	Per cent of total	Rate per thousand 300-day workers	Number	Per cent of total	Rate per thousand 300-day workers	Number	Per cent of total	Rate per thousand 300-day workers	Number	Rate per thousand 300-day workers
1930																							
Open-stope including room-and-pillar and sublevel stoping	590	14.04	33.60	1,085	25.83	61.78	19	0.45	1.08	644	15.33	36.67	175	4.17	9.96	1,495	35.59	85.13	193	4.59	10.99	4,201	239.21
Shrinkage	303	19.86	64.69	289	18.94	61.70	20	1.31	4.27	163	10.68	34.80	79	5.18	16.86	626	41.02	133.65	46	3.01	9.82	1,526	325.79
Cut and fill	179	25.83	47.45	58	8.37	15.38	18	2.60	4.77	52	7.50	13.79	15	2.16	3.98	343	49.50	90.93	28	4.04	7.42	693	183.72
Square-set	863	24.91	83.06	451	13.02	43.40	35	1.01	3.37	405	11.69	38.98	179	5.16	17.23	1,449	41.82	139.46	83	2.39	7.99	3,465	333.49
Block caving	183	26.95	46.09	57	8.39	14.35	28	4.12	7.05	66	9.72	16.62	41	6.04	10.32	288	42.42	72.53	16	2.36	4.03	679	170.99
Sublevel caving	53	29.61	19.07	19	10.61	6.83	3	1.68	1.08	18	10.05	6.47	5	2.79	1.80	78	43.58	28.06	3	1.68	1.08	179	64.39
Top slicing	125	25.35	18.76	45	9.13	6.75	7	1.42	1.05	52	10.55	7.81	16	3.25	2.40	240	48.68	36.03	8	1.62	1.20	493	74.00
Opencut with power shovel	58	9.92	6.93	1	.17	.12	22	3.76	2.63	75	12.82	8.96	58	9.92	6.93	371	63.41	44.33	----	----	----	585	69.90
Opencut with power scraper	2	5.56	5.99	1	2.78	2.99	----	----	----	3	8.33	8.98	9	25.00	26.95	21	58.33	62.87	----	----	----	36	107.78
Opencut, hand loading only	8	10.67	18.02	1	1.33	2.25	----	----	----	7	9.33	15.77	7	9.33	15.77	52	69.34	117.11	----	----	----	75	168.92
Hydraulicking	----	----	----	----	----	----	1	4.00	2.77	----	----	----	2	8.00	5.54	22	88.00	60.94	----	----	----	25	69.25
Dredging	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	7	100.00	129.63	----	----	----	7	129.63
Total, 1930	2,364	19.76	39.81	2,007	16.77	33.80	153	1.28	2.57	1,485	12.41	25.01	586	4.90	9.87	4,992	41.73	84.06	377	3.15	6.35	11,964	201.47
1929																							
Open-stope including room-and-pillar and sublevel stoping	601	11.36	29.26	1,478	27.93	71.95	40	0.76	1.95	884	16.70	43.03	181	3.42	8.81	1,872	35.37	91.13	236	4.46	11.49	5,292	257.62
Shrinkage	297	16.00	48.35	318	17.14	51.77	29	1.56	4.72	217	11.69	35.32	95	5.12	15.46	843	45.42	137.23	57	3.07	9.28	1,856	302.13
Cut and fill	219	20.13	44.81	182	16.73	37.24	12	1.10	2.46	149	13.70	30.49	33	3.03	6.75	449	41.27	91.88	44	4.04	9.00	1,088	222.63
Square-set	1,617	22.53	87.77	783	10.91	42.50	31	.43	1.68	973	13.55	52.81	378	5.27	20.52	3,262	45.44	177.05	134	1.87	7.27	7,178	389.60
Block caving	322	28.32	62.01	75	6.60	14.44	27	2.37	5.20	138	12.14	26.58	51	4.49	9.82	492	43.27	94.74	32	2.81	6.16	1,137	218.95
Sublevel caving	73	27.97	15.87	34	13.03	7.39	6	2.30	1.30	31	11.88	6.74	13	4.98	2.83	99	37.93	21.53	5	1.91	1.09	261	56.75
Top slicing	116	26.13	19.22	53	11.94	8.78	8	1.80	1.33	38	8.56	6.30	14	3.15	2.32	210	47.30	34.80	5	1.12	.83	444	73.58
Opencut with power shovel	119	10.06	11.27	4	.34	.38	29	2.45	2.75	130	10.99	12.32	146	12.34	13.83	755	63.82	71.53	----	----	----	1,183	112.08
Opencut with power scraper	----	----	----	----	----	----	----	----	----	2	66.67	20.41	----	----	----	1	33.33	10.20	----	----	----	3	30.61
Opencut, hand loading only	29	33.72	35.54	7	8.14	8.58	----	----	----	3	3.49	3.67	4	4.65	4.90	43	50.00	52.70	----	----	----	86	105.39
Hydraulicking	2	6.45	3.77	----	----	----	----	----	----	----	----	----	6	19.36	11.32	23	74.19	43.40	----	----	----	31	58.49
Dredging	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Total, 1929	3,395	18.29	43.63	2,934	15.81	37.70	182	0.98	2.34	2,565	13.82	32.96	921	4.96	11.83	8,049	43.37	103.43	513	2.77	6.59	18,559	238.48

[1] Underground and open pit only. No reports used where less than 25 men were employed. [2] Cause numbers refer to causes as shown in Table 24 and other similar tables.

TABLE 47.—*Accidents in 1930, by causes, grouped by mining methods, for selected companies* [1]

Method of mining	Underground [2]																	Shaft						
	Falls of rock or ore from roof or wall [3]	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 (other than locomotives or drills)	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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15a	15b		16	17	18	19	20	21	
KILLED [4]																								
Open-stope including room-and-pillar and sublevel stoping	27	1	1	11	7	3	1	-------	1	1	----	----	----	1	------	3	57	3	1	1	----	4	----	9
Shrinkage	12	1	-------	1	2	2	----	-------	----	----	----	----	----	----	------	1	19	1	1	2	----	3	2	9
Cut and fill	2	-------	-------	2	-------	3	----	-------	2	----	----	----	----	----	------	1	10	2	----	----	----	----	1	3
Square-set	16	-------	-------	5	6	4	----	-------	2	----	----	----	----	----	1	1	35	2	----	----	----	2	1	5
Block caving	3	-------	-------	----	2	----	1	-------	----	2	----	----	----	----	------	------	8	----	1	----	----	1	----	2
Sublevel caving	-------	1	-------	3	-------	1	----	-------	1	------	1	----	----	----	------	1	8	----	----	----	----	3	----	3
Top slicing	12	3	-------	4	1	-------	----	-------	1	------	----	1	----	----	------	------	22	----	----	----	----	----	----	0
Total, 1930	72	6	1	26	18	13	2	-------	7	3	1	1	----	1	1	7	159	8	3	3	----	13	4	31
Total, 1929	100	6	3	27	31	18	4	-------	6	4	----	2	1	----	1	6	209	11	7	----	----	16	4	38
INJURED																								
Open-stope including room-and-pillar and sublevel stoping	590	952	217	19	644	175	133	475	20	54	1	5	----	87	135	501	4,008	21	68	----	1	40	63	193
Shrinkage	303	236	82	20	163	79	53	152	2	18	----	5	----	32	86	249	1,480	----	14	----	----	15	17	46
Cut and fill	179	52	75	18	52	15	6	56	1	6	----	5	----	23	23	154	665	2	9	1	----	5	11	28
Square-set	863	416	565	35	405	179	35	187	5	28	----	12	1	161	117	373	3,382	2	23	1	----	33	24	83
Block caving	183	39	121	28	66	41	18	22	2	8	----	2	3	11	16	103	663	5	3	----	----	3	5	16
Sublevel caving	53	18	29	3	18	5	1	2	2	6	----	----	----	5	7	27	176	----	----	----	----	----	3	3
Top slicing	125	37	93	7	52	16	8	19	1	22	----	----	----	9	38	58	485	2	2	----	----	1	3	8
Total, 1930	2,296	1,750	1,182	130	1,400	510	254	913	33	142	1	29	4	328	422	1,465	10,859	32	119	2	1	97	126	377
Total, 1929	3,245	2,491	2,064	153	2,430	765	432	1,330	35	205	2	23	1	453	571	2,543	16,743	38	154	4	4	127	186	513

[1] Underground and open pit only. No reports used where less than 25 men were employed.
[2] Cause numbers refer to causes as shown in Table 24 and other similar tables.
[3] None killed in opencut with power scraper, opencut (hand loading only), hydraulicking, or dredging.

TABLE 47.—*Accidents in 1930, by causes, grouped by mining methods, for selected companies*—Continued

Method of mining	Surface											Open pit												Grand total
	Mine cars, mine locomotives, or aerial trams	Railway cars and locomotives	Run or fall of ore in or from ore bins	Falls of persons	Stepping on nail	Hand tools	Electricity	Machinery	Handling materials	Other causes	Total, surface	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 or from ore bins	Machinery (other than locomotives or power shovels)	Electricity	Hand tools	Handling materials	Other causes	Total, open pit	
	22	23	24	25	26	27	28	29	30a	30b		31	32	33	34	35	36	37	38	39	40	41a	41b		
KILLED [3]																									
Open-stope including room-and-pillar and sublevel stoping																								0	66
Shrinkage																								0	28
Cut and fill																								0	13
Square-set																								0	40
Block caving																								0	10
Sublevel caving																								0	11
Top slicing																								0	22
Opencut with power shovel												1	5		2									8	8
Total, 1930												1	5		2									8	198
Total, 1929												7	5	7	2				1			1	2	25	272
INJURED																									
Open-stope including room-and-pillar and sublevel stoping																									4,201
Shrinkage																									1,526
Cut and fill																									693
Square-set																									3,465
Block caving																									679
Sublevel caving																									179
Top slicing																									493
Opencut with power shovel												58	22	75	52	58	5	1	19	4	53	134	104	585	585
Opencut with power scraper												2		3	2	9		1	7		4	1	7	36	36
Opencut, hand-loading only												8		7		7	1	1	3		13	18	17	75	75
Hydraulicking													1		1	2			8		2	5	6	25	25
Dredging																							7	7	7
Total, 1930												68	23	85	55	76	6	3	37	4	72	158	141	728	11,964
Total, 1929												150	29	135	76	156	13	11	61	15	139	143	375	1,303	18,559

[3] None killed in opencut with power scraper, opencut (hand loading only), hydraulicking, or dredging.

TABLE 48.—*Number killed and injured per thousand 300-day workers, by mining methods and kind of mine, during the year ended December 31, 1930*[1]

UNDERGROUND AND OPEN PIT

Method of mining	Copper					Gold, silver, and miscellaneous metal					Iron				
	Number of 300-day workers	Killed		Injured		Number of 300-day workers	Killed		Injured		Number of 300-day workers	Killed		Injured	
		Number	Rate	Number	Rate		Number	Rate	Number	Rate		Number	Rate	Number	Rate
Open-stope including room and pillar and sublevel stoping	3,780	19	5.03	1,379	364.81	2,996	20	6.68	872	291.05	5,305	24	4.52	952	179.45
Shrinkage	1,386	6	4.33	603	435.06	2,881	23	7.98	850	295.04	445	2	4.49	107	240.45
Cut and fill	2,580	6	2.33	377	146.12	1,307	9	6.89	389	297.63	206			6	29.13
Square-set	5,306	24	4.52	1,404	264.61	5,621	19	3.38	2,159	384.10					
Block caving	3,746	9	2.40	642	171.38	81			14	172.84	122			20	163.93
Sublevel caving	481	2	4.16	8	166.32	73	3	41.10	25	342.47	2,247	6	2.67	154	68.54
Top slicing						459			94	204.79	6,042	22	3.64	364	60.24
Opencut with power shovel	2,189			210	95.93	272			36	132.35	4,991	7	1.40	233	46.68
Opencut with power scraper	3					24			1						
Opencut, hand loading only	18					191	2	10.47	10	52.36	1			1	
Hydraulicking						4									
Total	19,489	66	3.39	4,623	237.21	13,909	76	5.46	4,450	319.94	19,359	61	3.15	1,837	94.89

Method of mining	Lead and zinc (Mississippi Valley)					Nonmetallic mineral					Total				
	Number of 300-day workers	Killed		Injured		Number of 300-day workers	Killed		Injured		Number of 300-day workers	Killed		Injured	
		Number	Rate	Number	Rate		Number	Rate	Number	Rate		Number	Rate	Number	Rate
Open-stope including room and pillar and sublevel stoping	4,948	8	1.62	902	182.30	1,795	1	0.56	330	183.84	18,824	72	3.82	4,435	235.60
Shrinkage	90			10	111.11	152			35	230.26	4,954	31	6.26	1,605	323.98
Cut and fill	10			2		12			4		4,115	15	3.65	778	189.06
Square-set	21			1		10			2		10,958	43	3.92	3,566	325.42
Block caving	27	1		3		7			4		3,983	10	2.51	683	171.48
Sublevel caving						1					2,802	11	3.93	187	66.74
Top slicing	113			4	35.40	54			31	574.07	6,668	22	3.30	493	73.94
Opencut with power shovel						1,257	1	.80	151	120.13	8,709	8	.92	630	72.34
Opencut with power scraper						361			42	116.34	388			43	110.82
Opencut, hand loading only	22					637			103	161.70	869	2	2.30	114	131.19
Hydraulicking						429			25	58.28	433			25	57.74
Dredging						54			7	129.63	54			7	129.63
Total	5,231	9	1.72	922	176.26	4,769	2	0.42	734	153.91	62,757	214	3.41	12,566	200.23

[1] All placer mines omitted. All other reports used, regardless of size of mine, where method of mining is stated.

TABLE 49.—*Mining methods, by size of plant and number of days mine was active, for 8-hour workers only, during the year ended December 31, 1930* [1]

UNDERGROUND AND OPEN PIT

Method and size of plant	1 to 149 days							150 days or more						
	Number of plants	Men employed	Days of labor performed	Total hours	Number killed	Number injured	Killed and injured per 1,000,000 hours	Number of plants	Men employed	Days of labor performed	Total hours	Number killed	Number injured	Killed and injured per 1,000,000 hours
Open-stope including room-and-pillar and sublevel stoping:														
1 to 24 men	61	368	29,938	239,504	2	28	125.26	136	1,088	291,644	2,333,152	4	162	71.15
25 to 49 men	13	443	38,739	309,912		44	141.98	45	1,682	443,131	3,545,048	7	419	120.17
50 to 99 men	15	1,034	74,853	598,824		103	172.00	62	4,156	1,129,948	9,039,584	14	729	82.19
100 men or more	4	479	49,501	396,008		41	103.53	28	7,857	2,287,218	18,297,744	30	2,388	132.15
Total	93	2,324	193,031	1,544,248	2	216	141.17	271	14,783	4,151,941	33,215,528	55	3,698	112.99
Shrinkage:														
1 to 24 men	6	51	3,533	28,264				24	233	72,319	578,552	3	71	127.91
25 to 49 men								11	397	115,402	923,216	3	112	124.56
50 to 99 men								11	819	245,004	1,960,032	4	229	118.88
100 men or more	1	130	6,630	53,040		4	75.41	16	3,339	1,027,600	8,220,800	21	1,181	146.21
Total	7	181	10,163	81,304		4	49.20	62	4,788	1,460,325	11,682,600	31	1,593	139.01
Cut and fill:														
1 to 24 men	11	50	5,409	43,272		10	231.10	28	293	84,306	674,448	2	67	102.31
25 to 49 men								3	102	34,220	273,760	1	8	32.88
50 to 99 men	1	86	8,689	69,512		6	86.32	10	620	196,102	1,568,816	4	192	124.93
100 men or more								9	3,016	892,683	7,141,464	8	487	69.31
Total	12	136	14,098	112,784		16	141.86	50	4,031	1,207,311	9,658,488	15	754	79.62
Square set:														
1 to 24 men	36	166	14,720	117,760	1	10	93.41	66	488	140,632	1,125,056	2	77	70.22
25 to 49 men	1	31	3,346	26,768		1	37.36	12	407	122,328	978,624	1	111	114.45
50 to 99 men	1	94	7,050	56,400				11	804	239,913	1,919,304	1	347	181.32
100 men or more								29	8,673	2,724,680	21,797,440	38	2,986	138.73
Total	38	291	25,116	200,928	1	11	59.72	118	10,372	3,227,553	25,820,424	42	3,521	137.99

Block caving:													
1 to 24 men	1	17	2,232	17,856		4	224.01	1	5	1,500	12,000		
25 to 49 men								1	37	9,620	76,960	9	116.94
50 to 99 men								4	282	75,205	601,640	2	62	106.38
100 men or more								9	3,564	1,082,166	8,657,328	8	594	69.54
Total	1	17	2,232	17,856		4	224.01	15	3,888	1,168,491	9,347,928	10	665	72.21
Sublevel caving:													
1 to 24 men								2	23	6,150	49,200		8	162.60
25 to 49 men								1	38	11,448	91,584		9	98.27
50 to 99 men								6	489	133,297	1,066,376	4	44	45.01
100 men or more								8	2,237	617,183	4,937,464	5	63	13.77
Total								17	2,787	768,078	6,144,624	9	124	21.64
Top slicing:													
1 to 24 men								1	10	1,800	14,400			
25 to 49 men	1	45	4,800	38,400		2	52.08	5	220	56,252	450,016	3	49	115.55
50 to 99 men	1	78	5,307	42,456				17	1,272	337,894	2,703,152	5	109	42.17
100 men or more								24	5,445	1,594,260	12,754,080	14	333	27.21
Total	2	123	10,107	80,856		2	24.74	47	6,947	1,990,206	15,921,648	22	491	32.22
Opencut with power shovel:													
1 to 24 men	4	15	1,560	12,480				12	100	23,055	184,440		16	86.75
25 to 49 men														
50 to 99 men								3	296	98,244	785,952		16	20.36
100 men or more								4	1,738	599,469	4,795,752		203	42.33
Total	4	15	1,560	12,480				19	2,134	720,768	5,766,144		235	40.76
Opencut with power scraper:													
1 to 24 men	1	3	99	792				2	19	6,642	53,136		1	18.82
Opencut, hand loading only:													
1 to 24 men	11	53	3,017	24,136		2	82.86	25	157	36,701	293,608	2	11	44.28
25 to 49 men								3	106	24,875	199,000		12	60.30
Total	11	53	3,017	24,136		2	82.86	28	263	61,576	492,608	2	23	50.75
Hydraulicking: 1 to 24 men								4	64	19,200	153,600			

[1] All placer mines omitted. All other reports used, regardless of size of mine, where method of mining is stated.

TIME LOST FROM ACCIDENTS IN METAL MINES

The annual reports the Bureau of Mines receives from operating companies show the number and causes of accidents, with the accidents classified into four main groups based upon the severity of resulting injuries. These main groupings are referred to on page 6. The figures as furnished to the bureau do not show the length of disability of the employees following their injuries, but they do indicate whether the accidents were fatal or nonfatal and, if the latter, whether the injuries resulted in permanent disability or only temporary disability. If permanent injury resulted, the reports show whether the disability of the injured workman was total or only partial. Injuries disabling an employee for no more than the remainder of the day of the accident are not included in the accident statistics published by the Bureau of Mines.

Deaths and permanent total disabilities are weighted at 6,000 lost days each, in accordance with the scale adopted by the Association of Industrial Accident Boards and Commissions; permanent partial disabilities are weighted at 800 days each and temporary injuries at 13 days each.

In conformity with the above outline the aggregate loss of time represented by the 15,865 accidents that occurred in the metal-mining industry in the United States in 1930, as referred to in this publication, may be estimated at 2,339,000 man-days.

The loss of time from accidents in 1930 was calculated as follows:

	Lost days
271 fatalities, at 6,000 lost days each	1,626,000
22 permanent total disabilities, at 6,000 lost days each	132,000
481 permanent partial disabilities, at 800 lost days each	384,800
15,091 temporary disabilities (1 day or more) at 13 lost days each	196,183
Total (15,865 lost-time accidents)	2,338,983
Average lost days per accident	147

COMPARATIVE SEVERITY OF DIFFERENT CAUSES OF ACCIDENTS

For every accidental death in the metal mines of the United States during the past 10 years 77 men received nonfatal injuries serious enough to cause them to cease work for more than the remainder of the day on which they were hurt. Accidents causing a smaller loss of time—less than one day—are quite numerous, but of them the Bureau of Mines receives no reports.

Although the record showed 77 injuries for each death, many classes of accidents digressed widely from this average. For every fatality caused by stepping on nail, for example, there were 6,228 injuries of a nonfatal character. For every death caused by drilling there were 1,059 injuries. Such accidents, therefore, when they occur, are not likely to result fatally; they have a low mortality ratio.

Certain other classes of accidents, on the other hand, are much more likely to result fatally, such as those due to explosives, electricity, and falling down shafts. The highest mortality ratio for any class of accidents during the past decade is that for inrush of water; the record shows five deaths to each injury. Mine fires have had the next highest mortality ratio, the record showing one fatality to every injury during the past 10 years. Fortunately mine floods and mine fires do not often

result in injury to mine workers, but their occasional occurrence with heavy loss of life places both classes of accidents among the types that have had a large number of deaths in proportion to the total number of injuries.

The mortality ratio for each of the principal causes of accidents in metal mines for the 10-year period 1921 to 1930 is shown in Table 50. Table 51 gives additional data on severity of accidents for different classes of mines.

TABLE 50.—*All mines: Ratio of nonfatal to fatal accidents, by causes, during the 10-year period, 1921 to 1930*

Cause	Number of accidents		Per cent of accidents		Number of nonfatal injuries per fatality
	Fatal	Nonfatal	Fatal	Nonfatal	
Underground:					
1. Fall of rock or ore from roof or wall	990	41,386	2.34	97.66	41.8
2. Rock or ore while loading at working face	52	31,437	.17	99.83	604.6
3. Hand tools	32	22,943	.14	99.86	717.0
4. Explosives	341	2,803	10.85	89.15	8.2
5. Haulage	281	26,373	1.05	98.95	93.9
6. Falling down chute, winze, raise, or stope	234	7,255	3.12	96.88	31.0
7. Run of ore from chute or pocket	56	4,272	1.29	98.71	76.3
8. Drilling (by machine or hand drills)	16	16,941	.09	99.91	1,058.8
9. Electricity	54	721	6.97	93.03	13.4
10. Machinery (other than locomotives or drills)	16	2,594	.61	99.39	162.1
11. Mine fires	74	64	53.62	46.38	.9
12. Suffocation from natural gases	45	442	9.24	90.76	9.8
13. Inrush of water	113	27	80.71	19.29	.2
14. Stepping on nail	1	6,228	.02	99.98	6,228.0
15a. Handling materials (other than rock or ore)	4	1,109	.36	99.64	277.3
15b. Other causes	105	39,944	.26	99.74	380.4
Total, underground	2,414	204,539	1.17	98.83	84.7
Shaft:					
16. Falling down shaft	147	484	23.30	76.70	3.3
17. Objects falling down shaft	54	1,802	2.91	97.09	33.4
18. Breaking of cables	11	39	22.00	78.00	3.5
19. Overwinding	2	51	3.77	96.23	25.5
20. Cage, skip, or bucket	151	1,858	7.52	92.48	12.3
21. Other causes	51	2,372	2.10	97.90	46.5
Total, shaft	416	6,606	5.92	94.08	15.9
Surface:					
22. Mine cars or mine locomotives, gravity or aerial trams	30	1,819	1.62	98.38	60.6
23. Railway cars and locomotives	30	1,150	2.54	97.46	38.3
24. Run or fall of ore in or from ore bins	3	594	.50	99.50	198.0
25. Falls of persons	55	4,454	1.22	98.78	81.0
26. Stepping on nail	1	2,494	.04	99.96	2,494.0
27. Hand tools	5	5,092	.10	99.90	1,018.4
28. Electricity	52	392	11.71	88.29	7.5
29. Machinery	39	3,476	1.11	98.89	89.1
30a. Handling materials	4	662	.60	99.40	165.5
30b. Other causes	102	16,231	.62	99.38	159.1
Total, surface	321	36,364	0.88	99.12	113.3
Open pit:					
31. Falls or slides of rock or ore	68	2,066	3.19	96.81	30.4
32. Explosives	42	453	8.48	91.52	10.8
33. Haulage	75	1,706	4.21	95.79	22.7
34. Power shovels	18	1,005	1.76	98.24	55.8
35. Falls of persons	7	1,602	.44	99.56	228.9
36. Falls of derricks, booms, etc	6	164	3.53	96.47	27.3
37. Run or fall of ore in or from ore bins	2	119	1.65	98.35	59.5
38. Machinery (other than locomotives or power shovels)	4	828	.48	99.52	207.0
39. Electricity	9	83	9.78	90.22	9.2
40. Hand tools	1	1,645	.06	99.94	1,645.0
41a. Handling materials	1	356	.28	99.72	356.0
41b. Other causes	22	5,613	.39	99.61	255.1
Total, open pit	255	15,640	1.60	98.40	61.3
Grand total	3,406	263,149	1.28	98.72	77.3

TABLE 51.—*All mines: Labor and accident data classified by kind of mine and severity of injuries, for the year ended December 31, 1930*

Kind of mine	Men employed	300-day workers	Days of labor	Average days active	Number of injuries					Rate per thousand 300-day workers				
					Fatal	Permanent total	Permanent partial	Temporary	Total	Fatal	Permanent total	Permanent partial	Temporary	Total
Copper:														
Underground	18,569	18,092	5,427,527	292	70	3	104	4,486	4,663	3.87	0.17	5.75	247.95	257.74
Surface	7,138	7,183	2,154,924	302	6	-------	13	505	524	.84	-------	1.81	70.30	72.95
Open pit	1,985	2,226	667,786	336	-------	-------	2	208	210	-------	-------	.90	93.44	94.34
Total	27,692	27,501	8,250,237	298	76	3	119	5,199	5,397	2.76	.11	4.33	189.04	196.24
Gold, silver, and miscellaneous metal:														
Underground [1]	18,214	16,818	5,045,485	277	99	10	143	4,793	5,045	5.89	.60	8.50	284.99	299.98
Surface	5,691	5,102	1,530,598	269	6	-------	18	635	659	1.18	-------	3.53	124.46	129.17
Open pit	809	562	168,453	208	2	1	2	49	54	3.56	1.78	3.56	87.19	96.09
Hydraulic and dredge	2,331	1,770	531,067	228	2	-------	2	160	164	1.13	-------	1.13	90.40	92.66
Total	27,045	24,252	7,275,603	269	109	11	165	5,637	5,922	4.49	.45	6.80	232.44	244.18
Iron:														
Underground	16,317	14,760	4,427,868	271	56	3	94	1,563	1,716	3.79	.20	6.37	105.90	116.26
Surface	6,622	5,917	1,775,004	268	6	-------	6	186	198	1.01	-------	1.01	31.44	33.46
Open pit	6,471	5,067	1,520,283	235	7	1	10	233	251	1.38	.20	1.97	45.98	49.53
Total	29,410	25,744	7,723,155	263	69	4	110	1,982	2,165	2.68	.16	4.27	76.99	84.10
Lead and zinc (Mississippi Valley):														
Underground	7,444	5,351	1,605,455	216	9	2	48	916	975	1.68	.38	8.97	171.18	182.21
Surface	1,037	750	224,883	217	1	-------	6	109	116	1.33	-------	8.00	145.33	154.66
Open pit	43	22	6,485	151	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Total	8,524	6,123	1,836,823	215	10	2	54	1,025	1,091	1.63	.33	8.82	167.40	178.18
All metal mines:														
Underground	60,544	55,021	16,506,335	273	234	18	389	11,758	12,399	4.25	.33	7.07	213.70	225.35
Surface	22,819	20,722	6,216,476	272	21	-------	45	1,595	1,661	1.01	-------	2.17	76.97	80.15
Open pit	9,308	7,877	2,363,007	254	9	2	14	490	515	1.14	.25	1.78	62.21	65.38
Total	92,671	83,620	25,085,818	271	264	20	448	13,843	14,575	3.16	.24	5.36	165.54	174.30
Nonmetallic mineral:														
Underground	2,920	2,290	686,984	235	3	2	12	442	459	1.31	.87	5.24	193.02	200.44
Surface	4,107	4,127	1,238,106	301	3	-------	13	478	494	.73	-------	3.15	115.82	119.70
Open pit	3,535	2,863	859,074	243	1	-------	8	328	337	.35	-------	2.79	114.57	117.71
Total	10,562	9,280	2,784,164	264	7	2	33	1,248	1,290	.75	.21	3.56	134.48	139.00
Grand total:														
Underground	63,464	57,311	17,193,319	271	237	20	401	12,200	12,858	4.14	.35	7.00	212.87	224.36
Surface	26,926	24,849	7,454,582	277	24	-------	58	2,073	2,155	.97	-------	2.34	83.42	86.73
Open pit	12,843	10,740	3,222,081	251	10	2	22	818	852	.93	.19	2.05	76.16	79.33
Total	103,233	92,900	27,869,982	270	271	22	481	15,091	15,865	2.92	.24	5.18	162.44	170.78

[1] Includes underground men at placer mines.

SUMMARY DATA

Tables 52 to 62 give summary data, by States and years, on labor, accidents, etc.

TABLE 52.—*All mines: Number of active operators, by States, 1921 to 1930*

State	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
Alabama	15	15	15	13	11	12	15	13	16	13
Alaska	434	603	526	588	515	473	484	464	519	514
Arizona	280	211	252	226	209	200	197	212	193	231
California	201	244	311	318	344	415	453	496	538	476
Colorado	344	244	312	259	242	225	204	268	245	260
Florida	18	13	14	13	11	15	14	14	11	9
Georgia	11	8	7	7	12	12	16	10	14	14
Idaho	314	255	298	274	259	267	266	380	382	425
Illinois	6	5	7	7	7	8	6	4	6	9
Iowa	7	7	7	8	6	7	6	6	8	9
Kansas	15	20	21	20	29	32	29	29	31	25
Kentucky	9	9	7	7	8	12	10	13	13	14
Michigan	49	43	47	45	41	42	42	41	39	40
Minnesota	41	38	36	35	32	36	36	33	29	28
Missouri	17	15	16	19	31	25	21	16	16	16
Montana	189	139	144	128	128	134	124	107	97	127
Nevada	277	207	204	226	222	204	178	178	150	166
New Jersey	5	3	6	6	5	5	6	6	5	6
New Mexico	79	57	62	52	49	55	51	51	46	41
New York	22	21	21	22	19	26	29	31	31	27
North Carolina	11	11	12	6	9	12	10	9	7	12
Oklahoma	29	34	38	47	55	52	40	41	35	31
Oregon	118	70	90	97	84	82	67	70	58	58
Pennsylvania	8	9	10	9	11	12	13	9	9	11
South Dakota	30	24	28	22	22	21	18	26	20	26
Tennessee	16	19	23	16	16	23	15	18	17	17
Texas	9	13	12	11	10	9	13	15	17	18
Utah	160	113	127	145	147	125	117	115	113	117
Virginia	15	14	20	14	14	19	14	15	17	17
Washington	99	84	88	87	68	70	65	77	52	70
Wisconsin	16	11	16	15	14	14	13	9	11	10
Wyoming	19	16	22	12	14	22	17	21	14	31
Other States	33	24	26	29	28	13	38	45	34	38
Total	2,896	2,599	2,825	2,783	2,672	2,679	2,627	2,842	2,793	2,906

TABLE 53.—*All mines: Men employed and the equivalent in 300-day workers, by States, 1927, 1928, 1929, and 1930, with 5-year summary figures*

State	Actual number							Number 300-day workers						
	1911–1915	1916–1920	1921–1925	1927	1928	1929	1930	1911–1915	1916–1920	1921–1925	1927	1928	1929	1930
Alabama	24,321	39,546	32,610	6,191	6,052	5,195	4,966	23,003	38,877	28,912	5,644	5,237	4,626	4,253
Alaska	26,039	27,027	18,316	3,983	3,367	3,448	3,241	21,720	20,884	14,122	2,676	2,669	2,601	2,716
Arizona	72,916	92,641	53,802	12,056	11,771	13,072	10,162	73,651	95,696	54,663	13,113	13,129	14,215	9,705
California	52,840	44,121	29,404	6,584	6,433	7,455	5,941	49,714	44,049	29,040	6,027	5,778	6,374	4,962
Colorado	50,842	37,360	17,903	3,106	3,516	3,472	3,233	50,910	35,699	16,736	3,140	3,374	3,357	2,847
Florida	17,926	15,108	9,952	1,802	2,025	1,570	1,565	16,251	13,260	8,402	1,778	1,853	1,514	1,515
Georgia	2,560	3,090	1,169	290	275	273	202	1,888	2,377	758	212	271	220	171
Idaho	27,238	24,118	19,322	3,970	4,414	4,610	4,412	24,414	21,742	17,706	3,887	4,146	4,413	3,852
Illinois	2,673	3,187	2,545	296	239	380	380	2,405	2,867	1,946	176	230	344	237
Iowa	1,170	1,857	1,597	339	290	208	192	968	1,550	1,365	274	232	162	122
Kansas	2,918	4,932	7,894	2,887	2,505	3,164	1,957	2,148	4,078	6,840	2,402	2,052	2,380	1,370
Kentucky	1,832	2,207	3,390	1,217	1,109	1,022	1,082	1,248	1,584	3,122	1,002	1,018	786	660
Michigan	144,011	152,720	87,104	17,184	15,329	15,888	16,410	138,752	150,444	79,525	16,410	14,531	15,897	15,216
Minnesota	84,919	93,595	65,480	13,030	10,635	11,014	11,762	77,638	87,303	58,205	10,595	9,570	10,469	9,952
Missouri	49,101	41,420	23,104	3,301	2,708	2,682	2,567	42,321	36,391	23,192	3,316	2,649	2,565	2,360
Montana	73,078	74,948	46,830	9,607	9,412	11,523	6,491	72,207	75,174	46,754	9,366	9,372	11,494	6,313
Nevada	33,607	28,307	18,838	3,243	3,512	3,783	2,965	33,516	29,648	19,420	3,484	3,849	4,086	3,179
New Jersey	7,912	10,012	5,506	1,112	1,070	1,120	1,400	7,754	9,601	4,587	1,112	1,045	1,025	1,203
New Mexico	13,874	19,688	9,790	2,468	2,800	2,617	2,217	12,451	19,148	9,225	2,720	3,052	3,008	2,322
New York	14,817	17,924	12,858	2,893	2,781	2,424	2,334	13,916	17,469	10,081	2,577	2,190	2,204	2,104
North Carolina	4,853	3,076	1,522	398	321	416	575	3,270	2,475	1,145	366	347	379	563
Oklahoma	3,051	17,040	19,381	5,254	4,451	4,716	3,357	2,334	14,320	17,193	4,027	3,436	3,740	1,964
Oregon	6,144	4,876	2,035	407	443	405	369	4,084	3,376	1,313	346	374	358	283
Pennsylvania	3,089	1,991	2,382	761	567	498	507	2,591	1,763	1,933	736	470	456	448
South Dakota	10,210	8,705	7,769	1,423	1,429	1,246	1,676	10,237	9,467	8,570	1,580	1,607	1,479	1,666
Tennessee	17,159	16,993	10,568	1,790	1,933	1,971	1,769	14,478	15,149	8,919	1,703	1,911	1,944	1,737
Texas	1,624	6,408	7,616	2,133	2,017	1,979	2,019	1,591	7,262	7,828	2,446	2,268	2,247	2,241
Utah	35,326	31,782	29,841	6,632	7,195	7,901	5,352	37,566	34,336	33,429	7,310	7,995	8,740	5,580
Virginia	12,936	11,301	6,412	1,277	1,329	1,233	1,182	11,301	9,829	5,906	1,251	1,254	1,196	979
Washington	5,758	5,055	2,224	398	575	378	506	3,347	3,616	1,562	312	430	333	381
Wisconsin	16,235	15,079	6,192	1,743	1,407	1,407	1,154	14,693	13,393	5,140	1,694	1,230	1,312	1,047
Wyoming	2,756	2,039	1,445	536	594	429	274	2,136	1,624	1,192	525	614	430	145
Other States	12,952	11,562	7,945	1,388	1,362	1,236	1,014	11,457	10,506	7,803	1,240	1,162	1,040	807
Total	836,687	869,715	572,746	119,699	113,866	118,735	103,233	785,960	834,957	536,534	113,447	109,345	115,394	92,900

TABLE 54.—*All mines: Days of labor performed and average number of days mines were operated, by States, 1927, 1928, 1929, and 1930, with 5-year summary figures*

State	Days of labor performed							Average days active						
	1911–1915	1916–1920	1921–1925	1927	1928	1929	1930	1911–1915	1916–1920	1921–1925	1927	1928	1929	1930
Alabama	6,900,904	11,663,206	8,673,487	1,693,133	1,570,976	1,387,802	1,275,936	284	295	266	273	260	267	257
Alaska	6,515,964	6,265,134	4,236,502	802,777	800,565	780,439	814,788	250	232	231	202	238	226	251
Arizona	22,095,107	28,708,490	16,398,722	3,933,765	3,938,843	4,264,635	2,911,423	303	310	305	326	335	326	287
California	14,914,044	13,215,073	8,712,087	1,808,139	1,733,473	1,912,172	1,488,612	282	300	296	275	269	256	251
Colorado	15,273,161	10,709,491	5,020,689	942,145	1,012,173	1,007,083	854,017	300	287	280	303	288	290	264
Florida	4,875,228	3,977,847	2,520,396	533,377	555,813	454,258	454,480	272	263	253	296	274	289	290
Georgia	566,334	712,987	227,518	63,680	81,454	65,980	51,275	221	231	195	220	296	242	254
Idaho	7,324,329	6,522,369	5,311,556	1,166,237	1,243,698	1,323,935	1,155,447	269	270	275	294	282	287	262
Illinois	721,696	859,893	583,619	52,660	68,989	103,285	71,026	270	270	210	178	289	272	187
Iowa	290,232	465,061	409,754	82,139	69,552	48,638	36,740	148	250	257	242	240	234	191
Kansas	644,575	1,223,143	2,051,971	720,715	615,514	713,891	411,095	221	248	260	250	246	226	210
Kentucky	374,558	475,235	936,737	300,677	305,416	235,805	197,833	204	215	276	247	275	231	183
Michigan	41,625,755	45,133,306	23,857,434	4,922,865	4,359,182	4,768,968	4,564,822	289	296	274	286	284	300	278
Minnesota	23,291,284	26,191,086	17,461,611	3,178,459	2,871,020	3,140,758	2,985,645	274	280	267	244	270	285	254
Missouri	12,696,899	10,917,463	6,957,640	994,822	794,934	769,513	708,076	259	264	301	301	294	287	276
Montana	21,662,637	22,552,664	14,026,266	2,809,740	2,811,534	3,448,092	1,893,773	296	301	300	292	299	299	292
Nevada	10,055,034	8,894,152	5,826,148	1,045,098	1,154,783	1,225,725	953,754	299	314	309	322	329	324	322
New Jersey	2,326,024	2,880,538	1,376,360	333,597	313,716	307,468	361,021	294	288	250	300	293	275	258
New Mexico	3,735,301	5,744,344	2,767,353	815,891	915,609	902,519	696,573	269	292	283	331	327	345	314
New York	4,174,712	5,240,305	3,024,537	773,176	657,037	661,281	631,039	282	292	235	267	236	273	270
North Carolina	981,009	742,354	343,645	109,740	104,051	113,572	169,014	202	241	226	276	324	273	294
Oklahoma	700,382	4,295,906	5,158,205	1,208,031	1,030,948	1,121,887	589,165	230	252	266	230	232	238	176
Oregon	1,225,028	1,012,513	393,779	103,748	112,103	107,217	85,014	199	208	194	255	253	265	230
Pennsylvania	776,895	529,234	579,971	220,670	141,021	136,717	134,297	252	266	243	290	249	275	265
South Dakota	3,071,086	2,840,421	2,570,880	474,008	482,066	443,776	499,857	301	326	301	333	337	356	298
Tennessee	4,343,236	4,544,600	2,675,572	511,038	573,353	583,344	521,367	253	267	253	285	297	296	295
Texas	477,493	2,178,885	2,348,448	733,824	680,371	674,185	672,303	294	340	308	344	337	341	333
Utah	11,269,631	10,300,909	10,028,554	2,193,121	2,398,642	2,621,936	1,673,953	319	324	336	331	333	332	313
Virginia	3,390,448	2,948,235	1,772,034	375,212	376,340	358,940	293,927	262	261	276	294	283	291	249
Washington	1,004,099	1,084,881	468,578	93,705	128,947	99,814	114,205	174	215	211	235	224	264	226
Wisconsin	4,407,458	4,017,894	1,541,774	508,299	368,879	393,462	313,939	271	266	249	292	262	280	272
Wyoming	640,761	487,100	357,896	157,355	184,059	128,977	43,535	132	239	248	294	310	301	159
Other States	3,436,489	3,152,508	2,340,444	372,120	348,549	312,046	242,031	265	268	295	268	256	252	239
Total	235,787,793	250,487,227	160,960,167	34,033,963	32,803,610	34,618,120	27,869,982	282	288	281	284	288	292	270

TABLE 55.—*All mines: Fatalities and injuries, by States, 1927, 1928, 1929, and 1930, with 5-year summary figures*

State	Number killed							Number injured						
	1911–1915	1916–1920	1921–1925	1927	1928	1929	1930	1911–1915	1916–1920	1921–1925	1927	1928	1929	1930
Alabama	102	140	93	11	14	16	13	8,344	8,736	5,070	625	568	583	278
Alaska	87	84	47	8	6	14	6	890	1,996	1,141	393	422	373	369
Arizona	327	347	171	47	30	30	20	22,333	38,501	22,196	3,019	2,319	2,431	1,381
California	220	184	162	19	10	31	29	6,959	12,588	8,098	1,548	1,281	1,448	1,411
Colorado	231	205	64	23	10	21	15	3,908	4,626	2,551	466	574	826	657
Florida	42	36	14	5	5	2		1,017	1,646	1,832	210	253	254	110
Georgia	5	9						116	150	46	11	27	36	16
Idaho	126	80	69	15	10	14	19	3,693	4,561	5,516	1,137	1,108	1,083	926
Illinois	6	17	8				1	193	587	346	49	35	37	33
Iowa	3	1	3		1			191	269	296	48	41	28	14
Kansas	11	19	23	9	5	7	2	213	1,109	3,163	769	591	574	274
Kentucky	6	3	13	1		1		55	191	585	242	156	156	83
Michigan	510	476	192	43	42	38	46	36,069	35,385	17,412	3,234	2,632	2,572	2,121
Minnesota	268	256	181	27	12	32	24	23,390	18,257	7,743	824	643	661	603
Missouri	177	107	47	4	3		4	7,431	8,342	5,348	663	468	496	406
Montana	277	439	153	36	29	41	24	12,295	18,741	12,319	2,542	2,299	3,260	1,493
Nevada	149	127	73	10	18	17	10	4,120	4,807	4,522	769	693	840	595
New Jersey	57	36	22	6	4	6	5	2,077	1,628	1,403	205	196	171	222
New Mexico	61	69	34	8	13	10	5	1,272	3,848	2,030	615	466	696	549
New York	60	69	54	15	7	9	8	2,216	5,401	4,758	906	701	615	735
North Carolina	17	5	3	1	1	1		381	355	112	78	71	108	115
Oklahoma	10	64	41	12	6	9	1	398	5,461	11,599	1,405	1,444	1,163	465
Oregon	9	7	3	4			2	165	518	196	38	69	46	47
Pennsylvania	4	5	8		2	2	1	39	167	179	106	52	20	24
South Dakota	32	24	16	1	5	2	7	2,521	2,811	2,858	488	534	495	345
Tennessee	58	46	36	5	3	5	7	2,311	3,344	2,899	245	225	141	139
Texas	2	15	14	6	6	2	2	85	1,436	1,897	532	454	482	282
Utah	178	120	131	25	19	29	16	7,967	9,447	16,030	3,175	3,417	2,972	1,486
Virginia	25	21	8	2	3	3	1	674	915	564	174	223	172	146
Washington	15	11	6				1	131	563	168	34	61	62	62
Wisconsin	55	50	19	5	5	2	2	3,283	3,697	1,089	337	178	109	68
Wyoming	6	3	5	4	1	3		25	102	151	61	111	79	19
Other States	15	13	17		3	3		1,031	1,321	2,380	185	171	103	120
Total	3,151	3,088	1,730	352	273	350	271	155,793	201,506	146,497	25,133	22,483	23,092	15,594

TABLE 56.—*All mines: Fatalities and injuries per thousand 300-day workers employed, by States, 1927, 1928, 1929, and 1930, with 5-year summary figures*

State	Number killed per thousand 300-day workers							Number injured per thousand 300-day workers						
	1911–1915	1916–1920	1921–1925	1927	1928	1929	1930	1911–1915	1916–1920	1921–1925	1927	1928	1929	1930
Alabama	4.43	3.60	3.22	1.95	2.67	3.46	3.06	362.74	224.71	175.36	110.74	108.46	126.03	65.37
Alaska	4.01	4.02	3.33	2.99	2.25	5.38	2.21	40.98	95.58	80.80	146.86	158.11	143.41	135.86
Arizona	4.44	3.63	3.13	3.58	2.29	2.11	2.06	303.23	402.33	406.05	230.23	176.63	171.01	142.30
California	4.43	4.18	5.58	3.15	1.73	4.86	5.84	139.98	285.77	278.86	256.84	221.70	227.17	284.36
Colorado	4.54	5.74	3.82	7.32	2.96	6.26	5.27	76.76	129.58	152.43	148.41	170.12	246.05	230.77
Florida	2.58	2.71	1.67	2.81	2.70	1.32	----	62.58	124.13	218.04	118.11	136.54	167.77	72.61
Georgia	2.65	3.79	----	----	----	----	----	61.44	63.10	60.69	51.89	99.63	163.64	93.57
Idaho	5.16	3.68	3.90	3.86	2.41	3.17	4.93	151.27	209.78	311.53	292.51	267.25	245.41	240.39
Illinois	2.49	5.93	4.11	----	----	----	4.22	80.25	204.74	177.80	278.41	152.17	107.56	139.24
Iowa	3.10	.65	2.20	----	4.31	----	----	197.31	173.55	216.85	175.18	176.72	172.84	114.75
Kansas	5.12	4.66	3.36	3.75	2.44	2.94	1.46	99.16	271.95	462.43	320.15	288.01	241.18	200.00
Kentucky	4.81	1.89	4.16	1.00	----	1.27	----	44.07	120.58	187.38	241.52	153.24	198.47	125.76
Michigan	3.68	3.16	2.41	2.62	2.89	2.39	3.02	259.95	235.20	218.95	197.07	181.13	161.79	139.39
Minnesota	3.45	2.93	3.11	2.55	1.25	3.06	2.41	301.27	209.12	133.03	77.77	67.19	63.14	60.59
Missouri	4.18	2.94	2.03	1.21	1.13	----	1.69	175.59	229.23	230.60	199.94	176.67	193.37	172.03
Montana	3.84	5.84	3.27	3.84	3.09	3.57	3.80	170.27	249.30	263.49	271.41	245.31	283.63	236.50
Nevada	4.45	4.28	3.76	2.87	4.68	4.16	3.15	122.93	162.14	232.85	220.72	180.05	205.58	187.17
New Jersey	7.35	3.75	4.80	5.40	3.83	5.85	4.16	267.86	169.57	305.86	184.35	187.56	166.83	184.54
New Mexico	4.90	3.60	3.69	2.94	4.26	3.32	2.15	102.16	200.96	220.05	226.10	152.69	231.38	236.43
New York	4.31	3.95	5.36	5.82	3.20	4.08	3.80	159.24	309.18	471.98	351.57	320.09	279.04	349.33
North Carolina	5.20	2.02	2.62	2.73	2.88	2.64	----	116.51	143.43	97.82	213.11	204.61	284.96	204.26
Oklahoma	4.28	4.47	2.38	2.98	1.75	2.41	.51	170.52	381.35	674.64	348.89	420.26	310.96	236.76
Oregon	2.20	2.07	2.28	11.56	----	----	7.07	40.40	153.44	149.28	109.83	184.49	128.49	166.08
Pennsylvania	1.54	2.84	4.14	----	4.26	4.39	2.23	150.52	94.72	92.60	144.02	110.64	43.86	53.57
South Dakota	3.13	2.54	1.87	.63	3.11	1.35	4.20	246.26	296.93	333.49	308.86	332.30	334.69	207.08
Tennessee	4.01	3.04	4.04	2.94	1.57	2.57	4.03	159.62	220.74	325.04	143.86	117.74	72.53	80.02
Texas	1.26	2.07	1.79	2.45	2.65	.89	.89	53.43	197.74	242.34	217.50	200.18	214.51	125.84
Utah	4.74	3.49	3.92	3.42	2.38	3.32	2.87	212.08	275.13	479.52	434.34	427.39	340.05	266.31
Virginia	2.21	2.14	1.35	1.60	2.39	2.51	1.02	59.64	93.09	95.50	139.09	177.83	143.81	149.13
Washington	4.48	3.04	3.84	----	----	----	2.62	39.14	155.70	107.55	108.97	141.86	186.19	162.73
Wisconsin	3.74	3.73	3.70	2.95	4.07	1.52	1.91	223.44	276.04	211.87	198.94	144.72	83.08	64.95
Wyoming	2.81	1.85	4.20	7.62	1.63	6.98	----	117.04	62.81	126.68	116.19	180.78	183.72	131.03
Other States	1.31	1.24	2.18	----	2.58	2.88	----	89.99	125.74	305.01	149.19	147.16	99.04	148.70
Total	4.01	3.70	3.23	3.10	2.50	3.03	2.92	198.22	241.34	273.04	221.54	205.61	200.11	167.86

TABLE 57.—*Ten-year summary of accident data, by kinds of mines*

Kind of mine	Active operators	Number of men employed							
		Actual number				Equivalent in 300-day workers			
		Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total
Copper:									
1930	196	18,569	7,138	1,985	27,692	18,092	7,183	2,226	27,501
1929	204	25,239	8,632	3,276	37,147	26,722	9,412	3,812	39,946
1928	213	19,814	7,730	3,017	30,561	21,195	8,230	3,577	33,002
1927	211	20,380	7,375	2,969	30,724	21,025	7,636	3,423	32,084
1926	223	21,669	7,528	3,526	32,723	22,850	8,036	4,154	35,040
1925	249	21,979	7,567	3,720	33,266	22,466	7,897	4,373	34,736
1924	271	21,369	7,509	3,599	32,477	22,106	7,742	4,244	34,092
1923	306	21,655	7,888	2,934	32,477	22,720	8,165	3,470	34,355
1922	274	17,547	7,073	1,119	25,739	17,488	6,504	1,025	25,017
1921	357	12,865	4,770	665	18,300	10,863	3,616	392	14,871
Gold, silver, and miscellaneous metal:									
1930	2,255	18,214	8,022	809	27,045	16,818	6,872	562	24,252
1929	2,139	21,397	8,554	910	30,861	20,921	7,401	673	28,995
1928	2,196	21,416	9,090	1,116	31,622	21,433	8,030	978	30,441
1927	1,960	20,295	9,241	925	30,461	20,535	7,853	786	29,174
1926	2,000	23,202	9,581	1,157	33,940	23,698	8,547	737	32,982
1925	1,998	22,857	9,574	799	33,230	24,042	8,726	659	33,427
1924	2,097	19,617	9,445	656	29,718	19,943	8,486	614	29,043
1923	2,104	20,772	8,826	927	30,525	20,274	7,957	785	29,016
1922	1,942	18,362	8,542	710	27,614	18,090	7,498	556	26,144
1921	2,135	17,642	8,197	677	26,516	16,545	6,744	449	23,738
Iron:									
1930	88	16,317	6,622	6,471	29,410	14,760	5,917	5,067	25,744
1929	89	15,443	6,660	6,116	28,219	14,857	6,347	5,633	26,837
1928	99	16,614	6,500	6,031	29,145	15,087	5,752	5,117	25,956
1927	104	18,338	7,127	7,921	33,386	17,532	6,670	5,535	29,737
1926	101	18,792	7,712	6,654	33,158	18,110	7,303	5,066	30,479
1925	96	19,547	7,556	7,236	34,339	18,613	6,967	5,863	31,443
1924	104	20,325	7,918	8,386	36,629	18,425	7,097	7,317	32,839
1923	115	20,086	8,314	10,019	38,419	20,158	7,982	9,242	37,382
1922	110	17,596	6,715	7,930	32,241	15,221	5,762	6,638	27,621
1921	122	17,501	7,102	5,956	30,559	11,449	4,874	5,046	21,369
Lead and zinc (Mississippi Valley): [1]									
1930	77	7,444	1,037	43	8,524	5,351	750	22	6,123
1929	85	9,755	1,371	51	11,177	7,958	1,106	55	9,119
1928	85	8,733	1,574	27	10,334	7,354	1,289	16	8,659
1927	92	10,319	2,152	28	12,499	8,780	1,783	26	10,589
1926	112	11,848	2,612	19	14,479	10,458	2,300	13	12,771
1925	107	10,634	2,274	5	12,913	9,974	2,064	3	12,041
1924	87	9,431	3,303	-------	12,734	9,123	3,196	-------	12,319
1923	82	7,728	2,494	4	10,226	7,337	2,533	4	9,874
1922	74	6,747	2,193	50	8,990	6,263	2,029	40	8,332
1921	66	5,302	1,616	30	6,948	4,200	1,214	17	5,431
Nonmetallic mineral:									
1930	290	2,920	4,107	3,535	10,562	2,290	4,127	2,863	9,280
1929	276	3,389	4,158	3,784	11,331	2,867	4,248	3,382	10,497
1928	249	3,611	4,484	4,109	12,204	3,168	4,459	3,660	11,287
1927	260	3,853	4,686	4,090	12,629	3,435	4,676	3,752	11,863
1926	243	4,155	4,906	4,462	13,523	3,869	4,854	3,875	12,598
1925	231	3,949	4,748	4,268	12,965	3,689	4,557	4,015	12,261
1924	224	3,344	4,405	3,821	11,570	3,034	4,358	3,428	10,820
1923	218	3,346	4,604	3,682	11,632	3,180	4,735	3,324	11,239
1922	199	2,530	5,308	3,275	11,113	2,392	4,818	2,814	10,024
1921	216	2,630	4,433	4,543	11,606	2,142	3,778	3,181	9,101
Total United States:									
1930	2,906	63,464	26,926	12,843	103,233	57,311	24,849	10,740	92,900
1929	2,793	75,223	29,375	14,137	118,735	73,325	28,514	13,555	115,394
1928	2,842	70,188	29,378	14,300	113,866	68,237	27,760	13,348	109,345
1927	2,627	73,185	30,581	15,933	119,699	71,307	28,618	13,522	113,447
1926	2,679	79,666	32,339	15,818	127,823	78,985	31,040	13,845	123,870
1925	2,681	78,966	31,719	16,028	126,713	78,784	30,211	14,913	123,908
1924	2,783	74,086	32,580	16,462	123,128	72,631	30,879	15,603	119,113
1923	2,825	73,587	32,126	17,566	123,279	73,569	31,372	16,825	121,866
1922	2,599	62,782	29,831	13,084	105,697	59,454	26,611	11,073	97,138
1921	2,896	55,940	26,118	11,871	93,929	45,199	20,226	9,085	74,510

[1] Includes fluorspar mines in Illinois and Kentucky.

TABLE 57.—*Ten-year summary of accident data, by kinds of mines*—Continued

Kind of mine	Total shifts				Average days active			
	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total
Copper:								
1930	5,427,527	2,154,924	667,786	8,250,237	292	302	336	298
1929	8,016,491	2,823,557	1,143,664	11,983,712	318	327	349	323
1928	6,358,450	2,469,072	1,073,125	9,900,647	321	319	356	324
1927	6,307,475	2,290,853	1,026,989	9,625,317	309	311	346	313
1926	6,854,897	2,410,749	1,246,328	10,511,974	316	320	353	321
1925	6,739,906	2,369,033	1,311,864	10,420,803	307	313	353	313
1924	6,631,738	2,322,626	1,273,281	10,227,645	310	309	354	315
1923	6,815,855	2,449,522	1,041,089	10,306,466	315	311	355	317
1922	5,246,294	1,951,235	307,454	7,504,983	299	276	275	292
1921	3,258,838	1,084,833	117,625	4,461,296	253	227	177	244
Gold, silver, and miscellaneous metal:								
1930	5,045,485	2,061,665	168,453	7,275,603	277	257	208	289
1929	6,276,449	2,220,249	201,747	8,698,445	293	260	222	282
1928	6,429,835	2,408,875	293,505	9,132,215	300	265	263	289
1927	6,160,420	2,355,751	235,853	8,752,024	304	255	255	287
1926	7,109,372	2,564,100	221,173	9,894,645	306	268	191	292
1925	7,212,777	2,617,730	197,575	10,028,082	316	273	247	302
1924	5,983,018	2,545,780	184,133	8,712,931	304	270	281	293
1923	6,082,118	2,387,228	235,307	8,704,653	293	270	254	285
1922	5,426,808	2,249,737	166,735	7,843,280	296	263	235	284
1921	4,963,389	2,023,301	134,712	7,121,402	281	247	199	269
Iron:								
1930	4,427,868	1,775,004	1,520,283	7,723,155	271	268	235	263
1929	4,456,951	1,904,187	1,689,840	8,050,978	289	286	276	285
1928	4,526,312	1,725,602	1,534,970	7,786,884	272	265	255	267
1927	5,259,725	2,000,859	1,660,417	8,921,001	287	281	210	267
1926	5,433,170	2,191,040	1,519,639	9,143,849	289	284	228	276
1925	5,583,887	2,090,032	1,758,778	9,432,697	286	277	243	275
1924	5,527,645	2,129,096	2,195,014	9,851,755	272	269	262	269
1923	6,047,389	2,394,527	2,772,708	11,214,624	301	288	277	292
1922	4,566,323	1,728,452	1,991,450	8,286,225	260	257	251	257
1921	3,434,610	1,462,242	1,513,721	6,410,573	196	206	254	210
Lead and zinc (Mississippi Valley):[1]								
1930	1,605,455	224,883	6,485	1,836,823	216	217	151	215
1929	2,387,306	331,791	16,690	2,735,787	245	242	327	245
1928	2,206,149	386,728	4,704	2,597,581	253	246	174	251
1927	2,633,908	534,950	7,748	3,176,606	255	249	277	254
1926	3,137,283	689,949	3,959	3,831,191	265	264	208	265
1925	2,992,331	619,212	865	3,612,408	281	272	173	280
1924	2,736,927	958,737	----------	3,695,664	290	290	----------	290
1923	2,201,035	760,054	1,200	2,962,289	285	305	300	290
1922	1,878,975	608,566	11,990	2,499,531	278	278	240	278
1921	1,259,899	364,142	5,150	1,629,191	238	225	172	234
Nonmetallic mineral:								
1930	686,984	1,238,106	859,074	2,784,164	235	301	243	264
1929	860,188	1,274,520	1,014,490	3,149,198	254	307	268	278
1928	950,373	1,337,706	1,098,204	3,386,283	263	298	267	277
1927	1,030,505	1,402,812	1,125,698	3,559,015	267	299	275	282
1926	1,160,812	1,456,092	1,162,415	3,779,319	279	297	261	279
1925	1,105,564	1,367,305	1,204,500	3,678,369	280	288	282	284
1924	910,033	1,307,408	1,028,572	3,246,013	272	297	269	281
1923	954,199	1,420,386	997,188	3,371,773	285	309	271	290
1922	717,661	1,445,371	844,242	3,007,274	284	272	258	271
1921	642,532	1,133,469	954,239	2,730,240	244	256	210	235
Total United States:								
1930	17,193,319	7,454,582	3,222,081	27,869,982	271	277	251	270
1929	21,997,385	8,554,304	4,066,431	34,618,120	292	291	288	292
1928	20,471,119	8,327,983	4,004,508	32,803,610	292	283	280	288
1927	21,392,033	8,585,225	4,056,705	34,033,963	292	281	255	284
1926	23,695,534	9,311,930	4,153,514	37,160,978	297	288	263	291
1925	23,635,465	9,063,312	4,473,582	37,172,359	299	286	279	293
1924	21,789,361	9,263,647	4,681,000	35,734,008	294	284	284	290
1923	22,100,596	9,411,717	5,047,492	36,559,805	300	293	287	297
1922	17,836,061	7,983,361	3,321,871	29,141,293	284	268	254	276
1921	13,559,268	6,067,987	2,725,447	22,352,702	242	232	230	238

[1] Includes fluorspar mines in Illinois and Kentucky.

TABLE 57.—*Ten-year summary of accident data, by kinds of mines*—Continued

Kind of mine	Number killed				Number injured				Widows	Orphans
	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total		
Copper:										
1930	70	6	------	76	4,593	518	210	5,321	34	86
1929	108	9	4	121	7,625	833	483	8,941	33	56
1928	90	5	5	100	6,087	811	395	7,293	23	41
1927	99	4	8	111	7,056	752	571	8,379	56	109
1926	96	10	15	121	8,157	1,053	892	10,102	52	129
1925	80	8	14	102	9,969	1,203	1,007	12,179	40	86
1924	101	8	12	121	9,623	1,300	935	11,858	37	67
1923	90	8	9	107	10,119	1,255	619	11,993	34	54
1922	68	2	5	75	6,976	886	163	8,025	19	36
1921	49	6	------	55	4,073	495	154	4,722	27	39
Gold, silver, and miscellaneous metal:										
1930	99	8	2	109	4,946	815	52	5,813	44	56
1929	93	12	1	106	6,824	931	55	7,810	41	87
1928	68	11	------	79	7,102	987	91	8,180	29	61
1927	98	16	------	114	7,130	930	102	8,162	47	80
1926	89	18	1	108	8,570	1,228	80	9,878	45	88
1925	118	9	1	128	9,070	1,143	63	10,276	55	118
1924	135	9	1	145	7,402	1,149	98	8,649	69	145
1923	102	11	1	114	7,078	1,435	159	8,672	41	87
1922	131	9	------	140	5,923	794	88	6,805	42	79
1921	66	12	------	78	4,439	877	36	5,352	25	34
Iron:										
1930	56	6	7	69	1,660	192	244	2,096	48	104
1929	58	3	19	80	1,732	261	411	2,404	43	94
1928	47	3	6	56	1,955	334	258	2,547	31	84
1927	56	6	11	73	2,663	432	314	3,409	50	116
1926	116	6	7	129	3,233	511	338	4,082	94	190
1925	68	7	5	80	3,850	756	407	5,013	53	118
1924	71	7	19	97	3,708	741	510	4,959	67	162
1923	62	10	17	89	4,260	695	661	5,616	43	73
1922	64	4	15	83	3,700	599	602	4,901	57	118
1921	45	6	14	65	3,126	630	751	4,507	43	108
Lead and zinc (Mississippi Valley):[1]										
1930	9	1	------	10	966	115	--------	1,081	12	16
1929	17	2	------	19	1,965	204	4	2,173	12	31
1928	13	1	------	14	2,240	316	4	2,560	12	28
1927	27	1	------	28	2,866	285	1	3,152	22	62
1926	36	3	------	39	3,484	397	4	3,885	29	49
1925	37	3	------	40	5,036	600	--------	5,636	23	47
1924	34	------	------	34	5,226	492	--------	5,718	25	54
1923	25	2	------	27	4,455	439	--------	4,894	17	44
1922	22	------	------	22	3,470	319	79	3,868	15	25
1921	14	------	------	14	1,875	184	3	2,062	9	32
Nonmetallic mineral:										
1930	3	3	1	7	456	491	336	1,283	5	4
1929	16	5	3	24	532	688	544	1,764	9	20
1928	9	11	4	24	681	730	492	1,903	14	20
1927	10	7	9	26	733	683	615	2,031	9	16
1926	13	10	10	33	930	850	623	2,403	19	37
1925	9	7	5	21	813	647	568	2,028	9	15
1924	12	4	5	21	682	836	416	1,934	6	2
1923	10	11	9	30	796	1,181	411	2,388	13	16
1922	13	7	4	24	663	1,436	382	2,481	13	29
1921	8	4	6	18	627	925	409	1,961	8	19
Total United States:										
1930	237	24	10	271	12,621	2,131	842	15,594	143	266
1929	292	31	27	350	18,678	2,917	1,497	23,092	138	288
1928	227	31	15	273	18,065	3,178	1,240	22,483	109	234
1927	290	34	28	352	20,448	3,082	1,603	25,133	184	383
1926	350	47	33	430	24,374	4,039	1,937	30,350	239	493
1925	312	34	25	371	28,738	4,349	2,045	35,132	180	384
1924	353	28	37	418	26,641	4,518	1,959	33,118	204	430
1923	289	42	36	367	26,708	5,005	1,850	33,563	148	274
1922	298	22	24	344	20,732	4,034	1,314	26,080	146	287
1921	182	28	20	230	14,140	3,111	1,353	18,604	112	232

[1] Includes fluorspar mines in Illinois and Kentucky.

TABLE 57.—*Ten-year summary of accident data, by kinds of mines*—Continued

Kind of mine	Accident rates per thousand 300-day workers							
	Fatal				Nonfatal			
	Underground	Surface	Open pit	Total	Underground	Surface	Open pit	Total
Copper:								
1930	3.87	0.84	.....	2.76	253.87	72.11	94.34	193.48
1929	4.04	.96	1.05	3.03	285.35	88.50	126.71	223.83
1928	4.25	.61	1.40	3.03	287.19	98.54	110.43	220.99
1927	4.71	.52	2.34	3.46	335.60	98.48	166.81	261.16
1926	4.20	1.24	3.61	3.45	356.98	131.04	214.73	288.36
1925	3.56	1.01	3.20	2.94	443.74	152.34	230.28	350.62
1924	4.57	1.63	2.83	3.55	435.31	167.92	220.31	347.82
1923	3.96	.98	2.59	3.11	445.38	153.70	178.39	349.09
1922	3.89	.31	4.88	3.00	398.90	136.22	159.02	320.78
1921	4.51	1.66	.....	3.70	374.94	136.86	392.86	317.53
Gold, silver, and miscellaneous metal:								
1930	5.89	1.16	3.56	4.49	294.09	118.60	92.53	239.69
1929	4.45	1.62	1.49	3.66	326.18	125.79	81.72	269.36
1928	3.17	1.37	.....	2.60	331.36	122.91	93.05	268.72
1927	4.77	2.04	.....	3.91	347.21	118.43	129.77	279.77
1926	3.76	2.11	1.36	3.27	361.63	143.68	108.55	299.50
1925	4.91	1.03	1.52	3.83	377.26	130.99	95.60	307.42
1924	6.77	1.06	1.63	4.99	371.16	135.40	159.61	297.80
1923	5.03	1.38	1.27	3.93	349.12	180.34	202.55	298.87
1922	7.24	1.20	.....	5.35	327.42	105.89	158.27	260.29
1921	3.99	1.78	.....	3.29	268.30	130.04	80.18	225.46
Iron:								
1930	3.79	1.01	1.38	2.68	112.47	32.45	48.15	81.42
1929	3.90	.47	3.37	2.98	116.58	41.12	72.96	89.58
1928	3.12	.52	1.17	2.16	129.58	58.07	50.42	98.13
1927	3.19	.90	1.99	2.45	151.89	64.77	56.73	114.64
1926	6.41	.82	1.38	4.23	178.52	69.97	66.72	133.93
1925	3.65	1.00	.85	2.54	206.84	108.51	69.42	159.43
1924	3.85	.99	2.60	2.95	201.25	104.41	69.70	151.01
1923	3.08	1.25	1.84	2.38	211.33	87.07	71.52	150.23
1922	4.20	.69	2.26	3.00	243.09	103.96	90.69	177.44
1921	3.93	1.23	2.77	3.04	273.04	129.26	148.83	210.91
Lead and zinc (Mississippi Valley):[1]								
1930	1.68	1.33	.....	1.63	180.53	153.33	.....	176.55
1929	2.14	1.81	.....	2.08	246.92	184.45	72.73	238.29
1928	1.77	.78	.....	1.62	304.60	245.15	250.00	295.65
1927	3.08	.56	.....	2.64	326.42	159.84	38.46	297.67
1926	3.44	1.30	.....	3.05	333.14	172.61	307.69	304.20
1925	3.71	1.45	.....	3.32	504.91	290.70	.....	468.07
1924	3.73	.....	.....	2.76	572.84	153.94	.....	464.16
1923	3.41	.79	.....	2.73	607.20	173.31	.....	495.65
1922	3.51	.....	.....	2.64	554.05	157.22	.....	464.23
1921	3.33	.....	.....	2.58	446.43	151.57	176.47	379.67
Nonmetallic mineral:								
1930	1.31	.73	.35	.75	199.13	118.97	117.36	138.25
1929	5.58	1.18	.89	2.29	185.56	161.96	160.85	168.05
1928	2.84	2.47	1.09	2.13	214.96	163.71	134.43	168.60
1927	2.91	1.50	2.40	2.19	213.39	146.07	163.91	171.20
1926	3.36	2.06	2.58	2.62	240.37	175.11	160.77	190.74
1925	2.44	1.54	1.25	1.71	220.38	141.98	141.47	165.40
1924	3.96	.92	1.46	1.94	224.79	191.83	121.35	178.74
1923	3.14	2.32	2.71	2.67	250.31	249.42	123.65	212.47
1922	5.43	1.45	1.42	2.39	277.17	298.05	135.75	247.51
1921	3.73	1.06	1.89	1.98	292.72	244.84	128.58	215.47
Total United States:								
1930	4.14	.97	.93	2.92	220.22	85.76	78.40	167.86
1929	3.98	1.09	1.99	3.03	254.73	102.30	110.44	200.11
1928	3.33	1.12	1.12	2.50	264.74	114.48	92.90	205.61
1927	4.07	1.19	2.07	3.10	286.76	107.69	118.55	221.54
1926	4.43	1.51	2.38	3.47	308.59	130.12	139.91	245.01
1925	3.96	1.13	1.68	2.99	364.76	143.95	137.13	283.53
1924	4.86	.91	2.37	3.51	366.80	146.31	125.55	278.04
1923	3.92	1.34	2.14	3.01	362.54	159.54	109.96	275.41
1922	5.01	.83	2.17	3.54	348.71	151.59	118.67	268.48
1921	4.03	1.38	2.20	3.09	312.84	153.81	148.93	249.69

[1] Includes fluorspar mines in Illinois and Kentucky.

TABLE 58.—*Fatalities: By kinds of mines and causes, during the years ended December 31, 1921 to 1930*

Kind of mine	Underground																	Shaft						
	Fall of rock or ore from roof or wall	Rock or ore while loading at working face	Timber or hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of ore from chute or pocket	Drilling	Electricity	Machinery, (other than locomotives or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock 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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15a	15b		16	17	18	19	20	21	
Copper:																								
1930	23	1	1	8	8	5			2	3					1	4	56	3	2			7	2	14
1929	42	3	3	11	13	4	2		2	1						6	87	5	3			12	1	21
1928	21	1	2	10	16	7	5									7	69	8	1			10	2	21
1927	23	3	1	13	9	4	4	2	1		7	4				6	77	5	4			9	4	22
1926	38	1	1	12	8	9	4		2							8	83	5	1	1		5	1	13
1925	27		1	12	10	5	2	1	5			2				6	71	3	3			1	2	9
1924	38	3		15	11	7	2	1	1		1	2				9	90	2	1			5	3	11
1923	36	1	2	10	10	7		2	3			2	1			4	78	4	1			5	2	12
1922	30	1		2	10	7	3									2	55	2	1			8	2	13
1921	22			9	1	4	1									2	39	4	2			4		10
Gold, silver, and miscellaneous metal:																								
1930	28	1	2	13	6	15	2		3	1	5	1	1			2	80	4	3	2		8	2	19
1929	28	2		11	12	11	3		1		3	6			3		80	3	2			6	2	13
1928	25	2	1	6	4	11	1		1	1		3				2	57	1	2	1		6	1	11
1927	33			14	5	19				1		1	2			2	77	9	1			5	6	21
1926	28	1	1	14	6	14	3		1		3	2				4	77	4				8		12
1925	28	3	4	24	9	14	3	1	3			2	4			3	98	8	2	1		5	4	20
1924	37	1		18	6	6	1		2			2	46			2	121	11				3		14
1923	30	1	1	16	6	7	6		2	1	3	2				5	80	7	2	1		7	5	22
1922	27	1	1	14	4	19	3	1	1		47	1				1	120	3	3			4	1	11
1921	21		1	6	3	6	4		1			4				4	50	10	3			2	1	16

Iron:																								
1930	22	4		13	5	2			2		1	1				2	52	2		1		1		4
1929	29	1		6	6	5			2	2		1	1			1	54	2	1				1	4
1928	25	4		2	6		1		1	1	1					1	42	1	1			2	1	5
1927	22	2	2	2	8	7			1			2	3			4	53	3						3
1926	25	4	2	6	11	3	1		3				51			3	109	1				5	1	7
1925	32		1	5	14	4	2		3	1							62	2				4		6
1924	25	3		7	13	10	1	1	1		2		3			1	67	1				1	2	4
1923	22		1	8	20	3											54	3	2	1		2		8
1922	31	1	1	3	8	5	1	1	1	2						1	55	3	1	3		1	1	9
1921	11	2		3	5	2			1			1				2	27	6	2			10		18
Lead and zinc (Mississippi Valley): [1]																								
1930	6				2	1											9							0
1929	10	1			1	1		1		1							15	1	1					2
1928	7			1					1								9						4	4
1927	12	1		3	1			2	1			3				1	24	1	1			1		3
1926	14			11	1	2	1										29	3	3		1			7
1925	16	1	1	6	7						1					1	33	2	1			1		4
1924	19	1		5	4	1										1	31	2	1					3
1923	12		1	1	1	1			1	1						1	19	3	2		1			6
1922	10			2	2	1											15	4	1			2		7
1921	9			2		1										1	13	1						1
Nonmetallic mineral:																								
1930	1				1									1			3							0
1929	6			5					1			1					13	2				1		3
1928	6	1							1							1	9							0
1927	6			1	2												9	1						1
1926	8			2					2				1				13							0
1925	5			1	1							2					9							0
1924	1		1	2	4	1		1	1							1	12							0
1923	5					3										1	9	1						1
1922	3			6	1			2								1	13							0
1921	5															2	7	1						1
Total, United States:																								
1930	80	6	3	34	22	23	2		7	4	6	2	1	1	1	8	200	9	5	3		16	4	37
1929	115	7	3	33	32	21	5	1	6	4	3	8	1		3	7	249	13	7			19	4	43
1928	84	8	3	19	26	18	7		4	2	1	3				11	186	10	4	1		18	8	41
1927	96	6	3	33	25	30	4	4	3	1	7	10	5			13	240	19	6			15	10	50
1926	113	6	4	45	26	28	9		8		3	2	52			15	311	13	4	1	1	18	2	39
1925	108	4	7	48	41	23	7	2	11	1	1	6	4			10	273	15	6	1		11	6	39
1924	120	8	1	47	38	25	4	3	5		3	4	49			14	321	16	2			9	5	32
1923	105	2	5	35	37	21	6	2	6	2	3	4	1			11	240	18	7	2	1	14	7	49
1922	101	3	2	27	25	32	7	4	2	2	47	1				5	258	12	6	3		15	4	40
1921	68	2	1	20	9	13	5		2			5				11	136	22	7			16	1	46
Total, 10 years	990	52	32	341	281	234	56	16	54	16	74	45	113	1	4	105	2,414	147	54	11	2	151	51	416

[1] Includes fluorspar mines in Illinois and Kentucky.

TABLE 58.—*Fatalities: By kinds of mines and causes, during the years ended December 31, 1921 to 1930*—Continued

Kind of mine	Surface											Open pit												Grand total
	Mine cars, mine locomotives, or aerial trams	Railway cars and locomotives	Run or fall of ore in or from ore bins	Falls of persons	Stepping on nails	Hand tools, axes, bars, etc.	Electricity	Machinery	Handling materials	Other causes	Total, surface	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 or from ore bins	Machinery (other than locomotives or power shovels)	Electricity	Hand tools	Handling materials	Other causes	Total, open pit	
	22	23	24	25	26	27	28	29	30a	30b		31	32	33	34	35	36	37	38	39	40	41a	41b		
Copper:																									
1930				2				1	1	2	6													0	76
1929		1		2		1		2		3	9		2						1				1	4	121
1928				1		1	1			2	5	3					1		1					5	100
1927							1	1		2	4	3	1	2	1		1							8	111
1926		2		3			1	1		3	10	8	2	1						1			3	15	121
1925	3	2		2						1	8	4	2	4	1	1				1			1	14	102
1924		1					4			3	8	3	2	6	1									12	121
1923		3		1						4	8	1	2	4	1								1	9	107
1922		1								1	2		2	1									2	5	75
1921	2						1			3	6													0	55
Gold, silver, and miscellaneous metal:																									
1930	1			1			1		2	3	8	2												2	109
1929	2	1		3			2			4	12	1												1	106
1928		1		2	1		1	4		2	11													0	79
1927	4		1	2			2	4		3	16													0	114
1926	1	1		1			4	1		10	18	1												1	108
1925							3	2		4	9									1				1	128
1924	2						2	2		3	9					1								1	145
1923				1			1	3		6	11	1												1	114
1922	1			2			1	2		3	9													0	140
1921	2			4				1		5	12													0	78
Iron:																									
1930	1		1	3					1		6	1	4		2									7	69
1929								1		2	3	6	3	7	2							1		19	80
1928				1			1			1	3		2	4										6	56
1927	2	1						2		1	6	3	1	4	1			1		1				11	73
1926	1	1		1			1	1		1	6	1		5									1	7	129
1925		2	1	1			2	1			7	1	1	3										5	80

1924		1		1			2			3	7	5	2	8	2								2	19	97
1923	1	3		3			1	1		1	10	2	2	12	1									17	89
1922		2						1		1	4	4		6	1	1							3	15	83
1921	1			1		1				3	6	1	1	5	4		2	1						14	65
Lead and zinc (Mississippi Valley):[1]																									
1930				1							1														10
1929						1				1	2														19
1928										1	1														14
1927										1	1														28
1926				1			1			1	3														39
1925				1		1				1	3														40
1924																									34
1923				1			1				2														27
1922																									22
1921																									14
Nonmetallic mineral:																									
1930	1						2				3		1											1	7
1929	1	1		2						1	5	1											2	3	24
1928		1		2			2	1		5	11	1								1			2	4	24
1927	2	1		1			3				7	1	2		1	1	2		2				1	9	26
1926		1		1			3	2		3	10	3	2			1				2	1		1	10	33
1925	1			1			2	1		2	7	3	1			1								5	21
1924		1		1				1		1	4	3	1	1										5	21
1923				4			3	1		3	11	2	3	2		1							1	9	30
1922		1		1			2	1		2	7		1							2			1	4	24
1921	1	1					1	1			4	3	2										1	6	18
Total, United States:																									
1930	3		1	7			3	1	4	5	24	3	5		2									10	271
1929	3	3		7		2	2	3		11	31	8	5	7	2				1			1	3	27	350
1928		2		6	1	1	5	5		11	31	4	2	4			1		1	1			2	15	273
1927	8	2	1	3			6	7		7	34	7	4	6	3	1	3	1	2	1				28	352
1926	2	5		7			10	5		18	47	13	4	6		1				3	1		5	33	430
1925	4	4	1	5		1	7	4		8	34	8	4	7	1	2				2			1	25	371
1924	2	3		2			8	3		10	28	11	5	15	3	1							2	37	418
1923	1	6		10			6	5		14	42	6	7	18	2	1							2	36	367
1922	1	4		3			3	4		7	22	4	3	7	1	1				2			6	24	344
1921	6	1		5		1	2	2		11	28	4	3	5	4		2	1					1	20	230
Total, 10 years	30	30	3	55	1	5	52	39	4	102	321	68	42	75	18	7	6	2	4	9	1	1	22	255	3,406

[1] Includes fluorspar mines in Illinois and Kentucky.

TABLE 59.—*Injuries: By kinds of mines and causes, during the years ended December 31, 1921 to 1930*

Kind of mine	Underground																Shaft						
	Fall of rock or ore from roof or wall	Rock or ore while loading at working face	Timber or hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of ore from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock 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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15*a*	15*b*		16	17	18	19	20	21	
Copper:																								
1930	1,069	576	555	57	544	232	150	345	8	28		11	3	85	95	603	4,361	26	80	1		34	91	232
1929	1,578	837	949	69	966	333	251	513	15	61	1	10	2	183	316	1,184	7,268	30	106	2	1	82	136	357
1928	1,227	705	851	92	711	180	166	365	7	59		5		119		1,252	5,739	21	107			71	149	348
1927	1,351	893	921	100	850	241	235	484	10	42	1	19		182		1,397	6,726	28	87	2	15	67	131	330
1926	1,804	1,040	1,040	123	998	301	239	528	12	47		25		165		1,549	7,871	23	86	4		71	102	286
1925	1,887	1,211	1,104	108	1,237	305	410	589	12	83	3	58	1	212		2,422	9,642	23	94			92	118	327
1924	1,771	1,395	1,218	130	1,365	246	242	612	12	33	1	33		203		2,136	9,397	17	72	1		41	95	226
1923	2,269	1,265	1,233	147	1,283	315	346	674	17	61	2	18		249		2,002	9,881	7	72	1		58	100	238
1922	1,578	736	797	112	914	219	189	454	29	31	1	5		171		1,435	6,671	18	78	1		75	133	305
1921	863	678	428	61	521	139	118	200	9	43		1		84		794	3,939	11	42		1	49	31	134
Gold, silver, and miscellaneous metals:																								
1930	1,107	610	596	75	492	270	87	430	10	70	4	14	2	233	218	604	4,822	5	28	1		53	37	124
1929	1,419	655	1,002	71	862	399	155	582	6	84	3	15		247	206	974	6,680	5	34	3	2	53	47	144
1928	1,711	646	917	89	678	398	103	668	20	126	2	12		303		1,242	6,915	14	28	4		48	93	187
1927	1,690	627	975	82	754	397	129	602	31	68		9	2	298		1,307	6,971	10	39	2		50	58	159
1926	2,110	673	1,079	236	730	356	119	718	42	131	9	17	3	445		1,684	8,352	17	50	2	1	82	66	218
1925	2,137	776	1,061	103	610	346	109	650	9	77	4	31		398		2,542	8,853	16	42	1		95	63	217
1924	1,625	624	878	96	477	373	91	613	6	64	3	17	3	217		2,105	7,192	12	39	2		73	84	210
1923	1,826	836	718	135	597	252	173	754	28	71	2	19		327		1,069	6,807	33	68			103	67	271
1922	1,825	561	632	109	483	260	79	474	39	60	5	8		235		954	5,724	19	48	2	1	67	62	199
1921	922	491	511	61	473	220	54	454	12	46		20		157		871	4,292	17	33			51	46	147
Iron:																								
1930	272	318	151	19	231	52	40	129	9	57	1	1		29	97	229	1,635	5	4			10	6	25
1929	292	396	160	10	289	42	28	137	7	55				24	61	213	1,714	4	2			5	7	18
1928	366	290	211	36	299	75	30	113	17	49	8	4	4	50		371	1,923	5	8	1		9	9	32
1927	433	444	359	27	438	72	26	177	15	71		4	2	65		496	2,629	3	9			7	15	34
1926	556	520	392	44	495	63	61	202	19	102		5		73		653	3,185	6	9		1	17	15	48

1925	826	513	481	41	634	97	29	223	14	95	1	3	----	98	------	708	3,763	6	15	1	2	24	39	87
1924	669	514	530	28	767	109	48	195	18	97	3	2	1	88	------	573	3,642	3	21	----	2	15	25	66
1923	710	695	615	60	796	96	57	226	25	89	----	----	----	99	------	713	4,181	3	25	----	1	13	37	79
1922	690	554	568	42	639	118	60	214	33	67	----	7	----	110	------	519	3,621	9	19	1	----	17	33	79
1921	632	497	501	38	499	98	32	270	23	50	----	4	----	68	------	332	3,044	8	13	----	----	29	32	82
Lead and zinc (Mississippi Valley): [1]																								
1930	85	250	31	2	171	27	7	109	7	6	----	3	----	36	30	164	928	3	14	----	1	15	5	38
1929	189	598	69	19	343	59	9	223	7	14	----	1	----	47	36	302	1,916	4	17	----	1	11	16	49
1928	357	425	102	6	319	47	23	353	9	33	----	1	----	82	------	425	2,182	----	21	----	1	18	18	58
1927	287	830	119	26	443	50	37	461	9	52	----	3	----	98	------	361	2,776	4	31	1	1	23	30	90
1926	294	936	146	26	469	69	56	398	13	36	----	4	----	91	------	803	3,341	11	41	----	3	31	57	143
1925	368	1,496	152	27	925	90	92	676	15	70	10	3	3	297	------	559	4,783	4	76	2	6	112	53	253
1924	446	1,762	106	36	762	70	67	582	43	71	----	18	----	77	------	982	5,022	7	84	1	2	49	61	204
1923	502	1,442	111	37	509	49	13	531	17	38	----	8	----	60	------	957	4,274	14	67	2	7	56	35	181
1922	612	901	80	18	458	48	11	313	22	70	----	3	----	55	------	661	3,252	6	58	----	1	41	112	218
1921	243	457	25	35	267	33	13	185	7	45	----	5	----	28	------	477	1,820	1	25	----	----	9	20	55
Nonmetallic minerals:																								
1930	37	118	48	4	78	5	9	29	3	7	----	----	1	8	34	71	452	1	----	----	----	1	2	4
1929	67	141	58	9	98	8	5	35	2	9	----	----	----	8	16	70	526	----	3	----	----	2	1	6
1928	106	126	90	9	93	14	8	41	3	20	----	----	----	20	------	144	674	----	3	1	----	2	1	7
1927	98	170	91	10	118	18	10	57	7	24	----	----	----	20	------	98	721	----	1	----	----	5	6	12
1926	92	223	109	15	130	19	11	64	12	30	----	5	----	20	------	187	917	1	----	----	----	8	4	13
1925	118	206	52	10	135	17	1	70	5	17	----	6	----	25	------	141	803	3	----	----	1	3	3	10
1924	81	149	41	14	101	5	12	83	4	6	----	2	----	13	------	158	669	3	----	----	----	1	9	13
1923	73	227	30	16	138	9	28	41	5	5	----	1	----	16	------	195	784	2	1	----	----	4	5	12
1922	59	224	28	46	95	3	4	49	11	11	----	----	----	4	------	119	653	1	1	----	----	4	4	10
1921	57	180	22	37	89	11	------	46	6	13	----	2	----	6	------	136	605	15	1	----	----	2	4	22
Total, United States:																								
1930	2,570	1,872	1,381	157	1,516	586	293	1,042	37	168	5	29	6	391	474	1,671	12,198	40	126	2	1	113	141	423
1929	3,545	2,627	2,238	178	2,558	841	448	1,490	37	223	4	26	2	509	635	2,743	18,104	43	162	5	4	153	207	574
1928	3,767	2,192	2,171	232	2,100	714	330	1,540	56	287	10	22	4	574	------	3,434	17,433	40	167	6	1	148	270	632
1927	3,859	2,964	2,465	245	2,603	778	437	1,781	72	257	1	35	4	663	------	3,659	19,823	45	167	5	16	152	240	625
1926	4,856	3,392	2,766	444	2,822	808	486	1,910	98	346	9	56	3	794	------	4,876	23,666	58	186	6	5	209	244*	708
1925	5,336	4,202	2,850	289	3,541	855	641	2,208	55	342	18	101	4	1,030	------	6,372	27,844	52	227	4	9	326	276	894
1924	4,592	4,444	2,773	304	3,472	803	460	2,085	83	271	7	72	4	598	------	5,954	25,922	42	216	4	4	179	274	719
1923	5,380	4,465	2,707	395	3,323	721	617	2,226	92	264	4	46	----	751	------	4,936	25,927	59	233	3	8	234	244	781
1922	4,764	2,976	2,105	327	2,589	648	343	1,504	134	239	6	23	----	575	------	3,688	19,921	53	204	4	2	204	344	811
1921	2,717	2,303	1,487	232	1,849	501	217	1,155	57	197	----	32	----	343	------	2,610	13,700	52	114	----	1	140	133	440
Total, 10 years	41,386	31,437	22,943	2,803	26,373	7,255	4,272	16,941	721	2,594	64	442	27	6,228	1,109	39,943	204,538	484	1,802	39	51	1,858	2,373	6,607

[1] Includes fluorspar mines in Illinois and Kentucky.

Year	Surface											Open pit												Grand total
	Mine cars, mine locomotives, or aerial trams	Railway cars and locomotives	Run or fall of ore in or from ore bins	Falls of persons	Stepping on nail	Hand tools, axes, bars, etc.	Electricity	Machinery	Handling materials	Other causes	Total, surface	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 or from ore bins	Machinery (other than locomotives or power shovels)	Electricity	Hand tools	Handling materials	Other causes	Total, open pit	
	22	23	24	25	26	27	28	29	30a	30b		31	32	33	34	35	36	37	38	39	40	41a	41b		
GRAND TOTAL INJURED [1]																									
1930	0.894	0.474	0.560	3.262	1.410	2.777	0.269	2.314	3.455	7.524	22.939	0.883	0.280	1.098	0.614	0.915	0.075	0.075	0.495	0.043	0.872	1.948	1.765	9.063	167.858
1929	1.733	.780	.485	3.120	1.543	3.319	.174	2.331	2.955	8.839	25.279	1.508	.303	1.378	.719	1.447	.147	.104	.685	.147	1.361	1.517	3.657	12.973	200.114
1928	1.463	.768	.457	3.823	1.646	3.942	.320	2.735		13.910	29.064	1.518	.247	1.088	.521	1.244	.119	.101	.677	.201	1.033		4.591	11.340	205.615
1927	1.208	.679	.485	3.552	1.930	3.976	.167	2.900		12.270	27.167	1.560	.291	1.498	.617	1.419	.229	.141	.864	.062	1.543		5.906	14.130	221.540
1926	1.760	1.017	.589	4.246	2.309	5.159	.299	2.906		14.322	32.607	2.253	.630	1.784	.783	1.590	.105	.153	.993	.081	1.703		5.562	15.637	245.015
1925	1.421	1.057	.509	3.979	2.437	4.754	.500	3.583		16.859	35.099	2.373	.476	1.533	1.437	1.784	.331	.234	.904	.024	1.517		5.891	16.504	283.533
1924	1.326	.890	.462	4.349	2.367	5.272	.361	3.526		19.377	37.930	2.292	.520	1.763	.932	1.679	.143	.084	.798	.059	1.687		6.490	16.447	278.038
1923	3.413	1.904	.648	5.252	3.307	6.007	.418	3.783		16.338	41.070	1.945	.525	2.363	1.329	1.370	.115	.017	.763	.033	1.641		5.079	15.180	275.409
1922	1.699	1.822	.772	4.725	2.677	5.302	.587	3.891		20.054	41.529	2.481	.443	1.030	.875	1.266	.041	.072	.535	.062	1.760		4.962	13.527	268.484
1921	1.423	1.114	.483	4.483	3.395	6.254	.577	4.040		19.984	41.753	1.919	.349	1.973	1.409	1.946	.161	.081	.752	.040	1.986		7.543	18.159	249.685
CLASS TOTAL INJURED [2]																									
1930	3.340	1.770	2.093	12.194	5.272	10.383	1.006	8.652	12.918	28.130	85.758	7.635	2.421	9.497	5.307	7.914	.652	.652	4.283	.373	7.542	16.853	15.270	78.399	167.858
1929	7.014	3.156	1.964	12.625	6.243	13.432	.702	9.434	11.959	35.772	102.301	12.837	2.582	11.730	6.123	12.320	1.254	.885	5.828	1.254	11.583	12.910	31.133	110.439	200.114
1928	5.764	3.026	1.801	15.057	6.484	15.526	1.261	10.771		54.791	114.481	12.436	2.023	8.915	4.270	10.189	.974	.824	5.544	1.648	8.466		37.609	92.898	205.615
1927	4.787	2.691	1.922	14.082	7.652	15.759	.664	11.496		48.641	107.694	13.090	2.440	12.572	5.177	11.907	1.923	1.183	7.247	.518	12.942		49.549	118.548	221.540
1926	7.023	4.059	2.352	16.946	9.214	20.586	1.192	11.598		57.152	130.122	20.152	5.634	15.963	7.006	14.229	.939	1.372	8.884	.722	15.240		49.765	139.906	245.015
1925	5.826	4.336	2.085	16.319	9.996	19.496	2.052	14.697		69.147	143.954	19.714	3.956	12.741	11.936	14.819	2.749	1.945	7.510	.201	12.606		48.951	137.128	283.533
1924	5.117	3.433	1.781	16.775	9.132	20.338	1.393	13.602		74.743	146.314	17.497	3.973	13.459	7.114	12.818	1.089	.641	6.089	.449	12.882		49.542	125.553	278.038
1923	13.260	7.395	2.518	20.400	12.846	23.333	1.626	14.695		63.464	159.537	14.086	3.804	17.117	9.629	9.926	.832	.119	5.527	.238	11.887		36.790	109.955	275.409
1922	6.200	6.651	2.818	17.249	9.770	19.353	2.142	14.205		73.203	151.591	21.765	3.883	9.031	7.676	11.108	.361	.632	4.696	.542	15.443		43.530	118.667	268.484
1921	5.241	4.103	1.780	16.513	12.509	23.040	2.126	14.882		73.618	153.812	15.740	2.862	16.181	11.558	15.960	1.321	.660	6.164	.330	16.291		61.860	148.927	249.685

[1] Rates based on total number of employees.
[2] Underground and shaft rates based on number of employees underground, surface rates on surface employees, and open-pit rates on open-pit employees.

1925	70	37	11	100	78	138	21	66	----	235	756	33	16	55	60	27	4	----	21	----	46	----	145	407	5,013
1924	49	35	9	106	61	103	16	77	----	285	741	41	9	52	43	53	6	2	17	----	38	----	249	510	4,959
1923	45	24	5	82	47	101	21	68	----	302	695	52	13	101	70	89	5	----	25	----	69	----	237	661	5,616
1922	36	18	17	75	35	100	14	71	----	233	599	41	9	69	72	64	3	4	28	2	72	----	238	602	4,901
1921	25	18	19	77	52	110	11	62	----	256	630	71	9	93	86	90	7	5	21	----	86	----	283	751	4,507
Lead and zinc (Mississippi Valley):[1]																									
1930	9	2	6	14	11	10	----	10	16	37	115	----	----	----	----	----	----	----	----	----	----	----	----	----	1,081
1929	11	6	8	17	24	32	----	19	20	67	204	----	----	----	----	----	----	2	----	----	----	----	2	4	2,173
1928	10	4	1	26	30	49	1	52	----	143	316	1	----	----	----	----	1	----	----	----	----	----	2	4	2,560
1927	27	10	21	15	43	34	1	34	----	100	285	----	----	----	----	----	----	----	----	----	----	----	1	1	3,152
1926	18	6	10	31	36	60	----	51	----	185	397	4	----	----	----	----	----	----	----	----	----	----	----	4	3,885
1925	29	9	24	33	50	69	5	82	----	299	600	----	----	----	----	----	----	----	----	----	----	----	----	----	5,636
1924	9	10	16	24	44	75	2	64	----	248	492	----	----	----	----	----	----	----	----	----	----	----	----	----	5,718
1923	14	2	6	16	32	55	2	47	----	265	439	----	----	----	----	----	----	----	----	----	----	----	----	----	4,894
1922	19	11	29	13	25	40	----	30	----	152	319	33	----	----	----	8	----	----	6	----	9	----	23	79	3,868
1921	2	3	----	8	5	10	----	17	----	139	184	----	----	----	----	----	----	----	----	----	----	----	3	3	2,062
Nonmetallic mineral:																									
1930	5	13	1	43	38	59	5	54	115	158	491	32	12	34	18	38	4	6	27	1	35	66	63	336	1,283
1929	18	19	9	67	40	63	7	66	81	318	688	61	12	51	36	40	6	5	42	4	77	63	147	544	1,764
1928	19	20	6	86	45	79	8	45	----	422	730	57	5	47	20	55	4	7	37	10	61	----	189	492	1,903
1927	9	12	3	80	55	79	1	68	----	376	683	59	9	64	28	35	14	13	62	3	69	----	259	615	2,031
1926	14	13	13	103	56	108	5	79	----	459	850	98	7	66	23	32	11	11	68	6	85	----	216	623	2,403
1925	13	14	3	63	55	75	4	68	----	352	647	69	12	47	30	68	4	6	63	2	83	----	184	568	2,028
1924	18	17	9	69	82	104	7	78	----	452	836	59	5	28	10	43	1	4	36	2	41	----	187	416	1,934
1923	16	63	6	107	113	203	8	146	----	519	1,181	45	13	33	19	20	2	1	39	3	42	----	194	411	2,388
1922	17	47	3	135	120	149	10	108	----	847	1,436	91	9	15	2	29	1	1	9	1	53	----	171	382	2,481
1921	19	42	1	82	139	133	16	70	----	423	925	43	14	30	10	33	4	----	28	3	32	----	212	409	1,961
Total, United States:																									
1930	83	44	52	303	131	258	25	215	321	699	2,131	82	26	102	57	85	7	7	46	4	81	181	164	842	15,594
1929	200	90	56	360	178	383	20	269	341	1,020	2,917	174	35	159	83	167	17	12	79	17	157	175	422	1,497	23,092
1928	160	84	50	418	180	431	35	299	----	1,521	3,178	166	27	119	57	136	13	11	74	22	113	----	502	1,240	22,483
1927	137	77	55	403	219	451	19	329	----	1,392	3,082	177	33	170	70	161	26	16	98	7	175	----	670	1,603	25,133
1926	218	126	73	526	286	639	37	360	----	1,774	4,039	279	78	221	97	197	13	19	123	10	211	----	689	1,937	30,350
1925	176	131	63	493	302	589	62	444	----	2,089	4,349	294	59	190	178	221	41	29	112	3	188	----	730	2,045	35,132
1924	158	106	55	518	282	628	43	420	----	2,308	4,518	273	62	210	111	200	17	10	95	7	201	----	773	1,959	33,118
1923	416	232	79	640	403	732	51	461	----	1,991	5,005	237	64	288	162	167	14	2	93	4	200	----	619	1,850	33,563
1922	165	177	75	459	260	515	57	378	----	1,948	4,034	241	43	100	85	123	4	7	52	6	171	----	482	1,314	26,080
1921	106	83	36	334	253	466	43	301	----	1,489	3,111	143	26	147	105	145	12	6	56	3	148	----	562	1,353	18,604
Total, 10 years	1,819	1,150	594	4,454	2,494	5,092	392	3,476	662	16,231	36,364	2,066	453	1,706	1,005	1,602	164	119	828	83	1,645	356	5,613	15,640	263,149

[1] Includes fluorspar mines in Illinois and Kentucky.

TABLE 60.—*All mines: Fatalities per thousand 300-day workers employed during the years ended December 31, 1921 to 1930*

Year	Underground																Shaft						
	Fall of rock or ore from roof or wall	Rock or ore while loading at working face	Timber or hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of ore from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling materials (other than rock 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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15a	15b		16	17	18	19	20	21	
GRAND TOTAL KILLED [1]																								
1930	0.861	0.064	0.032	0.366	0.237	0.248	0.022	------	0.075	0.043	0.064	0.022	0.011	0.011	0.011	0.086	2.153	0.097	0.054	0.032	------	0.172	0.043	0.398
1929	.996	.061	.026	.286	.277	.182	.043	0.009	.052	.035	.026	.069	.009	------	.026	.061	2.158	.112	.061	------	------	.165	.035	.373
1928	.768	.073	.027	.174	.238	.165	.064	------	.037	.018	.009	.027	------	------	------	.101	1.701	.091	.037	.009	------	.165	.073	.375
1927	.846	.053	.026	.291	.220	.265	.035	.035	.026	.009	.062	.088	.044	------	------	.115	2.115	.168	.053	------	------	.132	.088	.441
1926	.912	.049	.032	.363	.210	.226	.073	------	.065	------	.024	.016	.420	------	------	.121	2.511	.105	.032	.008	0.008	.146	.016	.315
1925	.872	.032	.056	.387	.331	.186	.057	.016	.089	.008	.008	.048	.032	------	------	.081	2.203	.121	.048	.008	------	.089	.048	.315
1924	1.007	.067	.008	.395	.319	.210	.034	.025	.042	------	.025	.034	.411	------	------	.118	2.695	.134	.017	------	------	.076	.042	.269
1923	.862	.016	.041	.287	.304	.173	.049	.016	.049	.016	.025	.033	.008	------	------	.090	1.969	.148	.058	.016	.008	.115	.058	.402
1922	1.040	.031	.021	.278	.257	.329	.072	.041	.021	.021	.484	.010	------	------	------	.051	2.656	.124	.062	.031	------	.154	.041	.412
1921	.912	.027	.013	.269	.121	.174	.067	------	.027	------	------	.067	------	------	------	.148	1.825	.295	.094	------	------	.215	.013	.617
CLASS TOTAL KILLED [2]																								
1930	1.396	.105	.053	.593	.384	.401	.035	------	.122	.070	.105	.035	.017	.017	.017	.140	3.490	.157	.087	.053	------	.279	.070	.646
1929	1.568	.096	.041	.450	.436	.286	.068	.014	.082	.054	.041	.109	.014	------	.041	.096	3.396	.177	.096	------	------	.259	.054	.586
1928	1.231	.117	.044	.278	.381	.264	.103	------	.059	.029	.015	.044	------	------	------	.161	2.726	.146	.059	.015	------	.264	.117	.601
1927	1.346	.084	.042	.463	.351	.421	.056	.056	.042	.014	.098	.140	.070	------	------	.183	3.366	.267	.084	------	------	.210	.140	.701
1926	1.431	.076	.051	.570	.329	.354	.114	------	.101	------	.038	.025	.658	------	------	.190	3.937	.164	.051	.013	.013	.228	.025	.494
1925	1.371	.051	.089	.609	.520	.292	.089	.025	.139	.013	.013	.076	.051	------	------	.127	3.465	.191	.076	.013	------	.139	.076	.495
1924	1.652	.110	.014	.647	.523	.344	.055	.041	.069	------	.041	.055	.675	------	------	.193	4.419	.220	.028	------	------	.124	.069	.441
1923	1.425	.027	.068	.475	.502	.285	.082	.027	.082	.027	.041	.054	.014	------	------	.149	3.258	.244	.095	.027	.014	.190	.095	.665
1922	1.699	.050	.034	.454	.420	.538	.118	.067	.034	.034	.790	.017	------	------	------	.084	4.339	.202	.101	.050	------	.252	.067	.672
1921	1.505	.044	.022	.442	.199	.288	.111	------	.044	------	------	.111	------	------	------	.243	3.009	.487	.155	------	------	.354	.022	1.018

Year	Surface											Open pit												Grand total
	Mine cars, mine locomotives, or aerial trams	Railway cars and locomotives	Run or fall of ore in or from ore bins	Falls of persons	Stepping on nail	Hand tools, axes, bars, etc.	Electricity	Machinery	Handling materials	Other causes	Total, surface	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 or from ore bins	Machinery (other than locomotives or power shovels)	Electricity	Hand tools	Handling materials	Other causes	Total, open pit	
	22	23	24	25	26	27	28	29	30a	30b		31	32	33	34	35	36	37	38	39	40	41a	41b		
GRAND TOTAL KILLED [1]																									
1930	0.032		0.011	0.075			0.032	0.011	0.043	0.054	0.258	0.032	0.054		0.022									0.108	2.917
1929	.026	0.026		.061		0.017	.017	.026		.095	.268	.069	.043	0.061	.017				0.009			0.009	0.026	.234	3.033
1928		.018		.055	0.009	.009	.046	.046		.101	.284	.037	.018	.037			0.009		.009	0.009			.018	.137	2.497
1927	.070	.018	.009	.026			.053	.062		.062	.300	.062	.035	.053	.026	0.009	.026	0.009	.018	.009				.247	3.103
1926	.016	.040		.056			.081	.040		.146	.379	.105	.032	.049		.008				.024	0.008		.040	.266	3.471
1925	.032	.032	.008	.040		.008	.057	.032		.065	.274	.065	.032	.057	.008	.016				.016			.008	.202	2.994
1924	.017	.025		.017			.067	.025		.084	.235	.092	.042	.126	.025	.008							.017	.310	3.509
1923	.008	.049		.082			.049	.041		.115	.345	.049	.058	.148	.016	.008							.016	.295	3.011
1922	.010	.041		.031			.031	.041		.072	.226	.041	.031	.072	.010	.010				.021			.062	.247	3.541
1921	.081	.013		.067		.013	.027	.027		.148	.376	.054	.040	.067	.054		.027	.013					.013	.269	3.087
CLASS TOTAL KILLED [2]																									
1930	.121		.040	.282			.121	.040	.161	.201	.966	.279	.466		.186									.931	2.917
1929	.105	.105		.246		.070	.070	.105		.386	1.087	.590	.369	.516	.148				.074			.074	.221	1.992	3.033
1928		.072		.216	.036	.036	.180	.180		.396	1.116	.300	.150	.300			.075		.075	.075			.150	1.124	2.497
1927	.279	.070	.035	.105			.209	.245		245	1.188	.517	.296	.444	.222	.074	.222	.074	.148	.074				2.071	3.103
1926	.064	.161		.226			.322	.161		.580	1.514	.939	.289	.433		.072				.217	.072		.361	2.383	3.471
1925	.132	.132	.033	.166		.033	.232	.132		.265	1.125	.537	.268	.469	.067	.134				.134			.067	1.676	2.994
1924	.065	.097		.065			.259	.097		.324	.907	.705	.321	.961	.192	.064							.128	2.371	3.509
1923	.032	.191		.319			.191	.159		.446	1.338	.357	.416	1.070	.119	.059							.119	2.140	3.011
1922	.038	.150		.113			.113	.150		.263	.827	.361	.271	.632	.090	.090				.181			.542	2.167	3.541
1921	.297	.049		.247		.049	.099	.099		.544	1.384	.440	.330	.551	.440		.220	.110					.110	2.201	3.087

[1] Rates based on total number of employees.
[2] Underground and shaft rates based on number of employees underground; surface rates on surface employees; and open-pit rates on open-pit employees.

TABLE 61.—*All mines: Injuries per thousand 300-day workers employed during the years ended December 31, 1921 to 1930*

Year	Underground																	Shaft						
	Fall of rock or ore from roof or wall	Rock or ore while loading at working face	Timber or hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of ore from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling 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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15a	15b		16	17	18	19	20	21	
GRAND TOTAL INJURED [1]																								
1930	27.664	20.151	14.866	1.690	16.319	6.308	3.154	11.216	0.398	1.808	0.054	0.312	0.064	4.209	5.102	17.987	131.302	0.431	1.356	0.022	0.011	1.216	1.518	4.554
1929	30.721	22.765	19.394	1.543	22.168	7.288	3.882	12.912	.321	1.932	.035	.225	.017	4.411	5.503	23.771	156.888	.372	1.404	.043	.035	1.326	1.794	4.974
1928	34.451	20.047	19.854	2.122	19.205	6.530	3.018	14.084	.512	2.625	.091	.201	.037	5.249	------	31.405	159.431	.366	1.527	.055	.009	1.354	2.469	5.780
1927	34.016	26.127	21.728	2.160	22.945	6.858	3.852	15.699	.635	2.265	.009	.308	.035	5.844	------	32.253	174.734	.397	1.472	.044	.141	1.340	2.115	5.509
1926	39.202	27.384	22.330	3.584	22.782	6.523	3.924	15.419	.791	2.793	.073	.452	.024	6.410	------	39.364	191.055	.468	1.502	.049	.040	1.687	1.970	5.716
1925	43.064	33.912	23.001	2.333	28.578	6.900	5.173	17.820	.444	2.760	.145	.815	.032	8.313	------	51.425	224.715	.420	1.832	.032	.073	2.631	2.227	7.215
1924	38.552	37.309	23.281	2.552	29.149	6.741	3.862	17.504	.697	2.275	.059	.604	.034	5.020	------	49.986	217.625	.352	1.813	.034	.034	1.503	2.300	6.036
1923	44.147	36.639	22.213	3.241	27.268	5.916	5.063	18.266	.755	2.166	.033	.377	-----	6.162	------	40.504	212.750	.484	1.912	.025	.066	1.920	2.002	6.409
1922	49.044	30.637	21.670	3.366	26.653	6.671	3.531	15.483	1.379	2.460	.062	.237	-----	5.919	------	37.967	205.079	.546	2.100	.041	.021	2.100	3.541	8.349
1921	36.465	30.909	19.957	3.114	24.816	6.724	2.912	15.501	.765	2.644	-----	.429	-----	4.603	------	35.029	183.868	.698	1.530	-----	.013	1.879	1.785	5.905
CLASS TOTAL INJURED [2]																								
1930	44.843	32.664	24.097	2.739	26.452	10.225	5.112	18.182	.646	2.931	.087	.506	.105	6.822	8.271	29.157	212.839	.698	2.198	.035	.017	1.972	2.460	7.380
1929	48.346	35.827	30.522	2.427	34.886	11.469	6.110	20.320	.505	3.041	.055	.355	.027	6.942	8.660	37.409	246.901	.586	2.209	.068	.055	2.087	2.823	7.828
1928	55.205	32.123	31.816	3.400	30.775	10.463	4.836	22.568	.821	4.206	.146	.322	.059	8.412	------	50.325	255.477	.586	2.447	.088	.015	2.169	3.957	9.262
1927	54.118	41.567	34.569	3.436	36.504	10.911	6.128	24.976	1.010	3.604	.014	.491	.056	9.298	------	51.313	277.995	.631	2.342	.070	.224	2.132	3.366	8.765
1926	61.480	42.945	35.019	5.621	35.728	10.230	6.153	24.182	1.241	4.381	.114	.709	.038	10.053	------	61.733	299.627	.734	2.355	.076	.063	2.646	3.089	8.963
1925	67.730	53.336	36.175	3.608	44.946	10.852	8.136	28.026	.698	4.341	.228	1.282	.051	13.074	------	80.879	353.422	.660	2.881	.051	.114	4.138	3.503	11.347
1924	63.224	61.186	38.179	4.186	47.803	11.056	6.333	28.707	1.143	3.731	.096	.991	.055	8.234	------	81.976	356.900	.578	2.974	.055	.055	2.465	3.772	9.899
1923	73.029	60.609	36.746	5.362	45 107	9.787	8.375	30.216	1.249	3.584	.054	.625	-----	10.194	------	67.002	351.939	.801	3.163	.041	.108	3.176	3.312	10.601
1922	80.129	50.055	35.406	5.500	43.546	10.899	5.769	25.297	2.254	4.020	.101	.387	-----	9.671	------	62.031	335.065	.892	3.431	.067	.034	3.431	5.786	13.641
1921	60.112	50.952	32.899	5.133	40.908	11.084	4.801	25.554	1.261	4.358	-----	.708	-----	7.589	------	57.745	303.104	1.150	2.522	-----	.022	3.098	2.943	9.735

Year	Surface											Open pit												Grand total
	Mine cars, mine locomotives, or aerial trams	Railway cars and locomotives	Run or fall of ore in or from ore bins	Falls of persons	Stepping on nail	Hand tools, axes, bars, etc.	Electricity	Machinery	Handling materials	Other causes	Total, surface	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 or from ore bins	Machinery (other than locomotives or power shovels)	Electricity	Hand tools	Handling materials	Other causes	Total, open pit	
	22	23	24	25	26	27	28	29	30a	30b		31	32	33	34	35	36	37	38	39	40	41a	41b		
GRAND TOTAL INJURED [1]																									
1930	0.894	0.474	0.560	3.262	1.410	2.777	0.269	2.314	3.455	7.524	22.939	0.883	0.280	1.098	0.614	0.915	0.075	0.075	0.495	0.043	0.872	1.948	1.765	9.063	167.858
1929	1.733	.780	.485	3.120	1.543	3.319	.174	2.331	2.955	8.839	25.279	1.508	.303	1.378	.719	1.447	.147	.104	.685	.147	1.361	1.517	3.657	12.973	200.114
1928	1.463	.768	.457	3.823	1.646	3.942	.320	2.735		13.910	29.064	1.518	.247	1.088	.521	1.244	.119	.101	.677	.201	1.033		4.591	11.340	205.615
1927	1.208	.679	.485	3.552	1.930	3.976	.167	2.900		12.270	27.167	1.560	.291	1.498	.617	1.419	.229	.141	.864	.062	1.543		5.906	14.130	221.540
1926	1.760	1.017	.589	4.246	2.309	5.159	.299	2.906		14.322	32.607	2.253	.630	1.784	.783	1.590	.105	.153	.993	.081	1.703		5.562	15.637	245.015
1925	1.421	1.057	.509	3.979	2.437	4.754	.500	3.583		16.859	35.099	2.373	.476	1.533	1.437	1.784	.331	.234	.904	.024	1.517		5.891	16.504	283.533
1924	1.326	.890	.462	4.349	2.367	5.272	.361	3.526		19.377	37.930	2.292	.520	1.763	.932	1.679	.143	.084	.798	.059	1.687		6.490	16.447	278.038
1923	3.413	1.904	.648	5.252	3.307	6.007	.418	3.783		16.338	41.070	1.945	.525	2.363	1.329	1.370	.115	.017	.763	.033	1.641		5.079	15.180	275.409
1922	1.699	1.822	.772	4.725	2.677	5.302	.587	3.891		20.054	41.529	2.481	.443	1.030	.875	1.266	.041	.072	.535	.062	1.760		4.962	13.527	268.484
1921	1.423	1.114	.483	4.483	3.395	6.254	.577	4.040		19.984	41.753	1.919	.349	1.973	1.409	1.946	.161	.081	.752	.040	1.986		7.543	18.159	249.685
CLASS TOTAL INJURED [2]																									
1930	3.340	1.770	2.093	12.194	5.272	10.383	1.006	8.652	12.918	28.130	85.758	7.635	2.421	9.497	5.307	7.914	.652	.652	4.283	.373	7.542	16.853	15.270	78.399	167.858
1929	7.014	3.156	1.964	12.625	6.243	13.432	.702	9.434	11.959	35.772	102.301	12.837	2.582	11.730	6.123	12.320	1.254	.885	5.828	1.254	11.583	12.910	31.133	110.439	200.114
1928	5.764	3.026	1.801	15.057	6.484	15.526	1.261	10.771		54.791	114.481	12.436	2.023	8.915	4.270	10.189	.974	.824	5.544	1.648	8.466		37.609	92.898	205.615
1927	4.787	2.691	1.922	14.082	7.652	15.759	.664	11.496		48.641	107.694	13.090	2.440	12.572	5.177	11.907	1.923	1.183	7.247	.518	12.942		49.549	118.548	221.540
1926	7.023	4.059	2.352	16.946	9.214	20.586	1.192	11.598		57.152	130.122	20.152	5.634	15.963	7.006	14.229	.939	1.372	8.884	.722	15.240		49.765	139.906	245.015
1925	5.826	4.336	2.085	16.319	9.996	19.496	2.052	14.697		69.147	143.954	19.714	3.956	12.741	11.936	14.819	2.749	1.945	7.510	.201	12.606		48.951	137.128	283.533
1924	5.117	3.433	1.781	16.775	9.132	20.338	1.393	13.602		74.743	146.314	17.497	3.973	13.459	7.114	12.818	1.089	.641	6.089	.449	12.882		49.542	125.553	278.038
1923	13.260	7.395	2.518	20.400	12.846	23.333	1.626	14.695		63.464	159.537	14.086	3.804	17.117	9.629	9.926	.832	.119	5.527	.238	11.887		36.790	109.955	275.409
1922	6.200	6.651	2.818	17.249	9.770	19.353	2.142	14.205		73.203	151.591	21.765	3.883	9.031	7.676	11.108	.361	.632	4.696	.542	15.443		43.530	118.667	268.484
1921	5.241	4.103	1.780	16.513	12.509	23.040	2.126	14.882		73.618	153.812	15.740	2.862	16.181	11.558	15.960	1.321	.660	6.164	.330	16.291		61.860	148.927	249.685

[1] Rates based on total number of employees.
[2] Underground and shaft rates based on number of employees underground, surface rates on surface employees, and open-pit rates on open-pit employees.

TABLE 62.—*Fatalities and injuries, by cause and severity of injury, for the 5-year period 1926 to 1930*

Year	Underground																Shaft						
	Fall of rock or ore from roof or wall	Rock or ore while loading at working face	Timber or hand tools	Explosives	Haulage	Falling down chute, winze, raise, or stope	Run of ore from chute or pocket	Drilling	Electricity	Machinery (other than locomotives or drills)	Mine fires	Suffocation from natural gases	Inrush of water	Stepping on nail	Handling 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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15a	15b		16	17	18	19	20	21	
Killed:																								
1921 to 1925	502	19	16	177	150	114	29	11	26	5	54	20	54			51	1,228	83	28	6	1	65	23	206
1926	113	6	4	45	26	28	9		8		3	2	52			15	311	13	4	1	1	18	2	39
1927	96	6	3	33	25	30	4	4	3	1	7	10	5			13	240	19	6			15	10	50
1928	84	8	3	19	26	18	7		4	2	1	3				11	186	10	4	1		18	8	41
1929	115	7	3	33	32	21	5	1	6	4	3	8	1		3	7	249	13	7			19	4	43
1930	80	6	3	34	22	23	2		7	4	6	2	1	1	1	8	200	9	5	3		16	4	37
Total, 1926 to 1930	488	33	16	164	131	120	27	5	28	11	20	25	59	1	4	54	1,186	64	26	5	1	86	28	210
Permanent total:																								
1921 to 1925	12	2		27	1	2		1		2				1		3	51		2			1		3
1926	4	1	1	9		1											16		1					1
1927	4			3								1					8		1	1				2
1928	4	1		8		1											14		1					1
1929	5			3	4	1		2									15							
1930	6		2	9	2			1									20							
Total, 1926 to 1930	23	2	3	32	6	3		3				1					73		3	1				4
Permanent partial:																								
1921 to 1925	252	164	117	126	233	30	15	107	1	40	8			21		185	1,299	11	24	2	2	39	22	100
1926	74	47	48	54	66	9	8	22		18	1		1	3		40	391	4	1			6	6	17
1927	62	62	37	40	66	14	7	31	1	15				8		34	377		2			4	7	13
1928	95	48	37	22	63	10	9	40	4	17				8		65	418	1	3	3		10	4	21
1929	51	40	25	20	74	10	7	19	3	20				4	10	41	324	1	2			9	2	14
1930	72	55	32	12	82	13	8	33	3	16				5	13	32	376	4	3			11	7	25
Total, 1926 to 1930	354	252	179	148	351	56	39	145	11	86	1		1	28	23	212	1,886	10	11	3		40	26	90

Temporary (disability more than remainder of day of accident):																							
1921 to 1925	22,525	18,224	11,805	1,394	14,540	3,496	2,263	9,070	420	1,271	27	274	8	3,275	------	23,372	111,964	247	968	13	22	1,043	1,249	3,542
1926	4,778	3,344	2,717	381	2,756	798	478	1,888	98	328	8	56	2	791	------	4,836	23,259	54	184	6	5	203	238	690
1927	3,793	2,902	2,428	202	2,537	764	430	1,750	71	242	1	34	4	655	------	3,625	19,438	45	164	4	16	148	233	610
1928	3,668	2,143	2,134	202	2,037	703	321	1,500	52	270	10	22	4	566	------	3,369	17,001	39	163	3	1	138	266	610
1929	3,489	2,587	2,213	155	2,480	830	441	1,469	34	203	4	26	2	505	625	2,702	17,765	42	160	5	4	144	205	560
1930	2,492	1,817	1,347	136	1,432	573	285	1,008	34	152	5	29	6	386	461	1,639	11,802	36	123	2	1	102	134	398
Total, 1926 to 1930	18,220	12,793	10,839	1,076	11,242	3,668	1,955	7,615	289	1,195	28	167	18	2,903	1,086	16,171	89,265	216	794	20	27	735	1,076	2,868
Total injured:																							
1921 to 1925	22,789	18,390	11,922	1,547	14,774	3,528	2,278	9,178	421	1,313	35	274	8	3,297	------	23,560	113,314	258	994	15	24	1,083	1,271	3,645
1926	4,856	3,392	2,766	444	2,822	808	486	1,910	98	346	9	56	3	794	------	4,876	23,666	58	186	6	5	209	244	708
1927	3,859	2,964	2,465	245	2,603	778	437	1,781	72	257	1	35	4	663	------	3,659	19,823	45	167	5	16	152	240	625
1928	3,767	2,192	2,171	232	2,100	714	330	1,540	56	287	10	22	4	574	------	3,434	17,433	40	167	6	1	148	270	632
1929	3,545	2,627	2,238	178	2,558	841	448	1,490	37	223	4	26	2	509	635	2,743	18,104	43	162	5	4	153	207	574
1930	2,570	1,872	1,381	157	1,516	586	293	1,042	37	168	5	29	6	391	474	1,671	12,198	40	126	2	1	113	141	423
Total, 1926 to 1930	18,597	13,047	11,021	1,256	11,599	3,727	1,994	7,763	300	1,281	29	168	19	2,931	1,109	16,383	91,224	226	808	24	27	775	1,102	2,962
Total killed and injured:																							
1921 to 1925	23,291	18,409	11,938	1,724	14,924	3,642	2,307	9,189	447	1,318	89	294	62	3,297	------	23,611	114,542	341	1,022	21	25	1,148	1,294	3,851
1926	4,969	3,398	2,770	489	2,848	836	495	1,910	106	346	12	58	55	794	------	4,891	23,977	71	190	7	6	227	246	747
1927	3,955	2,970	2,468	278	2,628	808	441	1,785	75	258	8	45	9	663	------	3,672	20,063	64	173	5	16	167	250	675
1928	3,851	2,200	2,174	251	2,126	732	337	1,540	60	289	11	25	4	574	------	3,445	17,619	50	171	7	1	166	278	673
1929	3,660	2,634	2,241	211	2,590	862	453	1,491	43	227	7	34	3	509	638	2,750	18,353	56	169	5	4	172	211	617
1930	2,650	1,878	1,384	191	1,538	609	295	1,042	44	172	11	31	7	392	475	1,679	12,398	49	131	5	1	129	145	460
Total, 1926 to 1930	19,085	13,080	11,037	1,420	11,730	3,847	2,021	7,768	328	1,292	49	193	78	2,932	1,113	16,437	92,410	290	834	29	28	861	1,130	3,172

TABLE 62.—*Fatalities and injuries, by cause and severity of injury, for the 5-year period 1926 to 1930*—Continued

Year	Surface											Open pit													Grand total
	Mine cars, mine locomotives, or aerial trams	Railway cars and locomotives	Run or fall of ore in or from ore bins	Falls of persons	Stepping on nail	Hand tools, axes, bars, etc.	Electricity	Machinery	Handling materials	Other causes	Total, surface	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 or from ore bins	Machinery (other than locomotives or power shovels)	Electricity	Hand tools	Handling materials	Other causes	Total, open pit	
	22	23	24	25	26	27	28	29	30a	30b		31	32	33	34	35	36	37	38	39	40	41a	41b		
Killed:																									
1921 to 1925	14	18	1	25		2	26	18		50	154	33	22	52	11	5	2	1		4			12	142	1,730
1926	2	5		7			10	5		18	47	13	4	6		1				3	1		5	33	430
1927	8	2	1	3			6	7		7	34	7	4	6	3	1	3	1	2	1				28	352
1928		2		6	1	1	5	5		11	31	4	2	4			1		1	1			2	15	273
1929	3	3		7		2	2	3		11	31	8	5	7	2				1			1	3	27	350
1930	3		1	7			3	1	4	5	24	3	5		2									10	271
Total, 1926 to 1930	16	12	2	30	1	3	26	21	4	52	167	35	20	23	7	2	4	1	4	5	1	1	10	113	1,676
Permanent total:																									
1921 to 1925				1		1	1	1		4	8		4		1									5	67
1926										1	1			1									1	2	20
1927													1											1	11
1928	1			1						1	3												1	1	19
1929	1			1	1			2			5	1	1											2	22
1930													1										1	2	22
Total, 1926 to 1930	2			2	1			2		2	9	1	3	1									3	8	94
Permanent partial:																									
1921 to 1925	18	11	6	42	10	26	2	104		64	283	22	20	49	24	11	3		25		6		31	191	1,873
1926	4	3	2	6	1	15	2	27		24	84	10	6	10	9	7			6		5		12	65	557
1927	8	5	2	6	2	9		30		22	84	4	6	13	6	1	1		2	1	4		5	43	517
1928	5	6	3	10	4	14		19		16	77	4	1	8	3	3			4		2		9	34	550
1929	10	4		4	1	7		27	4	13	70	5	1	18	5	1			2	3	1	2	9	47	455
1930	4	5	2	4	3	3		16	7	14	58	2	2	2	3	2		1	3		3	4		22	481
Total, 1926 to 1930	31	23	9	30	11	48	2	119	11	89	373	25	16	51	26	14	1	1	17	4	15	6	35	211	2,560

Temporary (disability more than remainder of day of accident):																								
1921 to 1925	1,003	718	302	2,401	1,490	2,903	253	1,899		9,757	20,726	1,166	230	886	616	845	85	54	383	23	902		3,135	8,325	144,557
1926	214	123	71	520	285	624	35	333		1,749	3,954	269	72	210	88	190	13	19	117	10	206		676	1,870	29,773
1927	129	72	53	397	217	442	19	299		1,370	2,998	173	26	157	64	160	25	16	96	6	171		665	1,559	24,605
1928	154	78	47	407	176	417	35	280		1,504	3,098	162	26	111	54	133	13	11	70	22	111		492	1,205	21,914
1929	189	86	56	355	176	376	20	240	337	1,007	2,842	168	33	141	78	166	17	12	77	14	156	173	413	1,448	22,615
1930	79	39	50	299	128	255	25	199	314	685	2,073	80	23	100	54	83	7	6	43	4	78	177	163	818	15,091
Total, 1926 to 1930	765	398	277	1,978	982	2,114	134	1,351	651	6,315	14,965	852	180	719	338	732	75	64	403	56	722	350	2,409	6,900	113,998
Total injured:																								
1921 to 1925	1,021	729	308	2,444	1,500	2,930	256	2,004		9,825	21,017	1,188	254	935	641	856	88	54	408	23	908		3,166	8,521	146,497
1926	218	126	73	526	286	639	37	360		1,774	4,039	279	78	221	97	197	13	19	123	10	211		689	1,937	30,350
1927	137	77	55	403	219	451	19	329		1,392	3,082	177	33	170	70	161	26	16	98	7	175		670	1,603	25,133
1928	160	84	50	418	180	431	35	299		1,521	3,178	166	27	119	57	136	13	11	74	22	113		502	1,240	22,483
1929	200	90	56	360	178	383	20	269	341	1,020	2,917	174	35	159	83	167	17	12	79	17	157	175	422	1,497	23,092
1930	83	44	52	303	131	258	25	215	321	699	2,131	82	26	102	57	85	7	7	46	4	81	181	164	842	15,594
Total, 1926 to 1930	798	421	286	2,010	994	2,162	136	1,472	662	6,406	15,347	878	199	771	364	746	76	65	420	60	737	356	2,447	7,119	116,652
Total killed and injured:																								
1921 to 1925	1,035	747	309	2,469	1,500	2,932	282	2,022		9,875	21,171	1,221	276	987	652	861	90	55	408	27	908		3,178	8,663	148,227
1926	220	131	73	533	286	639	47	365		1,792	4,086	292	82	227	97	198	13	19	123	13	212		694	1,970	30,780
1927	145	79	56	406	219	451	25	336		1,399	3,116	184	37	176	73	162	29	17	100	8	175		670	1,631	25,485
1928	160	86	50	424	181	432	40	304		1,532	3,209	170	29	123	57	136	14	11	75	23	113		504	1,255	22,756
1929	203	93	56	367	178	385	22	272	341	1,031	2,948	182	40	166	85	167	17	12	80	17	157	176	425	1,524	23,442
1930	86	44	53	310	131	258	28	216	325	704	2,155	85	31	102	59	85	7	7	46	4	81	181	164	852	15,865
Total, 1926 to 1930	814	433	288	2,040	995	2,165	162	1,493	666	6,458	15,514	913	219	794	371	748	80	66	424	65	738	357	2,457	7,232	118,328

TABLE 63.—*Placer mines: Men employed, days worked, and number killed and injured during the years ended December 31, 1929 and 1930*

	1929					1930				
	Underground	Surface	Dredging	Hydraulicking	Total	Underground	Surface	Dredging	Hydraulicking	Total
Men employed	697	980	1,267	916	3,860	622	725	1,465	866	3,678
Days of labor	114,154	183,217	333,691	121,513	752,575	113,681	158,033	397,093	133,974	802,781
Number of 300-day workers	381	611	1,112	405	2,509	379	527	1,324	446	2,676
Average days active	164	187	263	133	195	183	218	271	155	218
Number killed	7	1	------	1	9	5	1	1	1	8
Number injured	49	146	116	23	334	42	112	120	42	316
Killed per thousand 300-day workers	18.37	1.64	------	2.47	3.59	13.19	1.90	0.76	2.24	2.99
Injured per thousand 300-day workers	128.61	238.95	104.32	56.79	133.12	110.82	212.52	90.63	94.17	118.09

TABLE 64.—*Placer mines: Severity of accidents during the years ended December 31, 1929 and 1930*

	1929						1930					
	Killed	Permanent total disability	Permanent partial disability	Temporary (disability more than remainder of day of accident)	Total nonfatal	Grand total	Killed	Permanent total disability	Permanent partial disability	Temporary (disability more than remainder of day of accident)	Total nonfatal	Grand total
Underground	7	------	------	49	49	56	5	------	------	42	42	47
Surface	1	------	3	143	146	147	1	------	2	110	112	113
Dredging	------	------	1	115	116	116	1	------	2	118	120	121
Hydraulicking	1	------	3	20	23	24	1	------	------	42	42	43
Total	9	------	7	327	334	343	8	------	4	312	316	324

TABLE 65.—*Placer mines: Number of men killed and injured by causes, during the years ended December 31, 1929 and 1930*

Cause	1929		1930	
	Killed	Injured	Killed	Injured
Fall of rock or ore from roof or wall	2	8	------	4
Rock or ore while loading at working face	------	2	------	5
Timber or hand tools	------	9	------	8
Mine fires	------	------	5	3
Haulage	------	5	------	5
Falling down chute, winze, raise, or stope	------	3	------	5
Run of ore from chute or pocket	1	------	------	------
Drilling	------	7	------	1
Machinery	------	3	------	1
Suffocation from natural gases	3	------	------	------
Stepping on nail	------	5	------	3
Other causes	------	6	------	4
Total, underground	6	48	5	39
Skip, cage, or bucket	1	1	------	3
Total, shaft	1	1	------	3
Mine cars, mine locomotives, or aerial trams	------	3	------	2
Falls of persons	------	18	------	25
Stepping on nail	------	14	------	10
Hand tools	------	23	------	14
Electricity	------	------	------	3
Machinery	------	13	------	12
Handling materials	------	15	1	6
Other causes	1	60	------	40
Total, surface	1	146	1	112

TABLE 65.—*Placer mines: Number of men killed and injured by causes, during the years ended December 31, 1929 and 1930*—Continued

Cause	1929		1930	
	Killed	Injured	Killed	Injured
Machinery		27		25
Electricity		3		5
Falls of persons		22		15
Tools		11		30
Handling materials		8		12
Other causes		45	1	33
Total, dredging		116	1	120
Cave of bank			1	2
Hydraulic giants		3		3
Falls of persons		1		6
Rock while handling		3		8
Tools		3		7
Machinery		1		5
Handling materials (other than rock or ore)		4		2
Other causes	1	8		9
Total, hydraulicking	1	23	1	42
Grand total	9	334	8	316

TABLE 66.—*List of accidents in metal and nonmetallic mines (except coal) in the United States in which five or more lives were lost. (Incomplete and unofficial)*

Date	Product	Name of mine	Location	Killed	Nature of accident
1869—Apr. 7	Gold	Kentuck - Yellow Jacket - Crown Point.	Gold Hill, Nev	37	Fire in timber, probably from candle.
1873—Sept. 20	do	Yellow Jacket	do	6	Fire from blacksmith forge on 1,300-foot level.
1874—June —	do	Amador	Amador, Calif	5	Fall of cage; night shift coming to surface; 5 men in cage; when within 5 feet of surface cage suddenly fell to bottom, 1,640 feet.
1881—Feb. 16	Copper	Belmont	Belmont, Mont	6	Fire from blacksmith shop spread to magazine of powder and then to shaft.
1885—Nov. 13		Bull Domingo	Silver Cliff, Colo	10	Explosives; box of dynamite exploded in boiler room; headframe burned; men in mine suffocated.
1887—June 24	Gold, silver	Gould & Curry	Virginia City, Nev	6	Fire in shaft station, 1,500-foot level; cause unknown.
1889—Nov. 23	Copper	Neversweat - St. Lawrence.	Butte, Mont	6	Mine fire; candle in chute on 400-foot level.
1893—Apr. 21		Silver Bow No. 2	do	9	Mine fire; probably from candle at pump station.
1895—Mar. 10	Gold	Old Abe	White Oaks, N. Mex.	8	Mine fire; burning shaft house and shaft timbers.
Sept. 7	Copper	Osceola	Calumet, Mich	30	Mine fire on twenty-seventh level; cause unknown.
1896—Apr. 8	Gold	Hope	Basin, Mont	7	Mine fire.
Apr. 11	Copper	St. Lawrence	Butte, Mont	6	Powder explosion.
1901—June 4	Iron	Chapin	Iron Mountain, Mich.	8	Explosion of dynamite; asphyxiation by fumes; cause unknown.
Nov. 20	Gold, silver	Smuggler-Union	Pandora, Colo	31	Fire in bunk house at mine entrance.
1903—Nov. 6	Gold	Kearsarge	Virginia City, Mont.	9	Mine fire, cause unknown.
1907—Nov. 30	do	Fremont	Drytown, Calif	11	Fire at foot of shaft; cause unknown.

TABLE 66.—*List of accidents in metal and nonmetallic mines (except coal) in the United States in which five or more lives were lost. (Incomplete and unofficial)*—Continued

Date	Product	Name of mine	Location	Killed	Nature of accident
1911—Jan. 18	Gold	Keating	Radersburg, Mont.	5	Powder explosion in shaft.
Feb. 23	Gold, silver	Belmont shaft	Tonopah, Nev.	17	Fire, asphyxiation.
Mar. 11	Iron	Norman (open pit)	St. Louis County, Minn.	14	Slide of ore.
May 5	do	Hartford - Cambria No. 2.	Negaunee, Mich.	7	Mine fire; men overcome by gas and smoke.
Aug. 23	Copper	Giroux	Kimberly, Nev.	7	Mine fire caused by explosion.
Sept. 3	Zinc	Black Rock shaft	Butte, Mont.	6	Cage accident.
1912—Apr. 24	Copper	Leonard shaft	do	5	Fall of cage.
May 13	Iron	Norrie	Ironwood, Mich.	7	Cave-in.
July 7	Copper	Eureka pit	McGill, Nev.	10	Dynamite explosion.
1913—Apr. 17	do	Miami	Miami, Ariz.	5	Air blast, resulting from cave-in; threw men against walls and timbers.
Apr. 22	do	Leonard	Butte, Mont.	5	Shaft accident.
1914—Jan. 21	do	Boston	Bingham, Utah	5	Mine fire; cause unknown.
July 14	Iron	Balkan	Palatka, Mich.	7	Men drowned by rush of sand and water into raise.
Aug. 4	Copper	Copper Flat (steam-shovel pit).	McGill, Nev.	5	Premature blast.
Sept. 17	Gold	Centennial Eureka.	Eureka, Utah	11	Cave-in.
Nov. 9	Iron	Sibley No. 9 shaft	Ely, Minn.	5	Shaft cave-in.
1915—Oct. 19	Copper	Granite Mountain shaft.	Butte, Mont.	16	Dynamite explosion.
1916—Feb. 14	do	Pennsylvania	do	21	Mine fire.
1917—Feb. 25	Gold, lead, silver, zinc.	North Star	Hailey, Idaho	16	Snowslide struck compressor and bunk house.
Apr. 28	Gold	Mountain King	Mariposa County, Calif.	7	Asphyxiation by power fumes.
June 8	Copper	Granite Mountain	Butte, Mont.	163	Mine fire.
July 17	Gypsum	Three Forks	Trident, Mont.	8	Powder explosion.
1918—Before Feb. 26.	Iron	Amasa Porter	Crystal Falls, Mich.	8	Cave-in.
June 27	do	Silver	Virginia, Minn.	18	Premature powder explosion, caused by lightning.
1919—July 25	Lead	Hecla	Burke, Idaho	5	Cage accident; power applied in wrong direction.
1920—Apr. 15	Salt	Jefferson Island Salt Mining Co.	Delcambre, La.	6	Gas explosion.
1922—Aug. 27	Gold	Argonaut	Jackson, Calif.	47	Mine fire, cause unknown.
1923—July 12	Iron	Sloss No. 1	Bessemer, Ala.	5	Haulage; man trip broke loose.
1924—Feb. 5	Manganiferous iron ore.	Milford	Crosby, Minn.	41	Inrush of water.
1926—Nov. 3	Iron	Barnes-Hecker	Ishpeming, Mich.	51	Mine flood.
1927—Oct. 29	Copper	No. 2 shaft, Quincy Mining Co.	Hancock, Mich.	7	Fall of rock in shaft.
Nov. 24	do	No. 2 shaft, Magma Copper Co.	Superior, Ariz.	7	Shaft fire.
1929—Sept. 4	do	Calaveras Copper Co.	Copperopolis, Calif.	5	Cave of stope.
1930—June 7	Molybdenum	Climax Molybdenum Co.	Climax, Colo.	5	Fall of rock.
July 14	Gold	Glenn	Placer County, Calif.	5	Mine fire in surface buildings. Fumes entered mine.

ACCIDENTS IN MINERAL INDUSTRIES

Tables 67 to 71 have been prepared to show the comparative accident rates for 1930 in all branches of the mineral industry for which nation-wide statistics are compiled by the Bureau of Mines. Reports of accidents in the steel industry are not collected by the bureau.

For all branches of the mineral industry covered by this publication, the frequency of nonfatal accidents in proportion to the number of men employed was greatest at the coal mines, and the lowest injury rate was for cement-rock quarries. The highest fatality rate was for trap-rock quarries, the next highest rate for coal mines, and the third highest for gold, silver, and miscellaneous metal mines; the lowest rate was for smelters, and the next lowest for slate quarries.

Table 71 indicates the percentage of deaths due to each of the chief causes of accidents at coal mines, metal mines, and quarries. During the 19 years covered by the table most of the fatal accidents at coal mines were due to falls of roof or coal, haulage equipment, and gas and coal-dust explosions. At metal mines the main causes of fatalities were falls of rock or ore, haulage equipment, falls of persons, and explosives. Fatal accidents at quarries during most of the 19 years were due mainly to falls or slides of rock or overburden, haulage equipment, machinery, and explosives.

TABLE 67.—*United States: Accident data, including rates for different branches of mineral industries in 1930 compared on a 300-day basis (length of shift not considered)*

Branch of mineral industry	Average days active	Men employed		Man-shifts	Killed	Injured	Rate per thousand 300-day workers	
		Actual number	Equivalent in 300-day workers (calculated)				Killed	Injured
Coal mines	192	644,006	412,979	123,893,697	2,063	103,821	5.00	251.40
All metal mines	270	103,233	92,900	27,869,982	271	15,594	2.92	167.86
Copper	298	27,692	27,501	8,250,237	76	5,321	2.76	193.48
Gold, silver, and miscellaneous metal	269	27,045	24,252	7,275,603	109	5,813	4.49	239.69
Iron	263	29,410	25,744	7,723,155	69	2,096	2.68	81.42
Lead and zinc (Mississippi Valley)	215	8,524	6,123	1,836,823	10	1,081	1.63	176.55
Nonmetallic mineral	264	10,562	9,280	2,784,164	7	1,283	.75	138.25
All quarries (including outside works)	255	80,633	68,531	20,559,372	105	7,417	1.53	108.23
Cement rock	298	19,998	19,883	5,964,948	17	678	.86	34.10
Granite	240	10,414	8,325	2,497,394	12	1,191	1.44	143.06
Limestone	242	34,193	27,636	8,290,818	49	3,946	1.77	142.78
Marble	276	6,087	5,601	1,680,301	6	512	1.07	91.41
Sandstone and bluestone	212	3,545	2,510	752,974	7	305	2.79	121.51
Slate	216	2,955	2,123	636,978	1	323	.47	152.14
Trap rock	214	3,441	2,453	735,959	13	462	5.30	188.34
All quarries (excluding outside works)	230	39,073	30,001	9,000,450	74	4,652	2.47	155.06
All quarries (outside works only)	278	41,560	38,530	11,558,922	31	2,765	.80	71.76
All metallurgical plants	327	40,787	44,403	13,321,025	25	2,726	.56	61.39
Ore dressing	287	11,648	11,131	3,339,399	6	881	.54	79.15
Smelters	350	17,168	20,035	6,010,530	7	1,061	.35	52.96
Auxiliary works	332	11,971	13,237	3,971,096	12	784	.91	59.23
All coke ovens	347	19,855	22,936	6,880,895	28	1,022	1.22	44.56
Beehive	202	2,176	1,464	439,296	1	104	.68	71.04
By-product	364	17,679	21,472	6,441,599	27	918	1.26	42.75
Total, 1930	217	888,514	641,749	192,524,971	2,492	130,580	3.88	208.48
Total, 1929	243	928,648	752,809	225,842,583	2,728	38,806	3.62	143.06

NOTE.—This table does not include the steel industry, petroleum and natural-gas wells, sand and gravel pits and dredge workings, and clay pits, as accident statistics for these industries have not as yet been collected by the Bureau of Mines.

TABLE 68.—*Comparative mortality ratio in metal mines and quarries*

[Inside pit or underground only]

	Number of 300-day workers	Accident rates per thousand 300-day workers	Number killed and injured					Per cent of total				
			Fatal	Permanent total	Permanent partial	Temporary (disability more than remainder of day of accident)	Total	Fatal	Permanent total	Permanent partial	Temporary (disability more than remainder of day of accident)	Total
1923:												
Metal mines	73,669	366.46	289	17	312	26,379	26,997	1.07	0.06	1.16	97.71	100
Quarries	50,226	180.09	99	10	276	8,660	9,045	1.10	.11	3.05	95.74	100
1924:												
Metal mines	72,631	371.66	353	7	293	26,341	26,994	1.31	.02	1.09	97.58	100
Quarries	50,506	179.90	96	11	326	8,653	9,086	1.06	.12	3.59	95.23	100
1925:												
Metal mines	78,784	368.73	312	17	513	28,208	29,050	1.07	.06	1.77	97.10	100
Quarries	44,263	197.30	101	17	274	8,341	8,733	1.16	.19	3.14	95.51	100
1926:												
Metal mines	78,985	313.02	350	17	408	23,949	24,724	1.42	.07	1.65	96.86	100
Quarries	42,708	190.03	110	12	280	7,714	8,116	1.36	.15	3.45	95.04	100
1927:												
Metal mines	71,307	290.83	290	10	390	20,048	20,738	1.40	.05	1.88	96.67	100
Quarries	41,421	195.89	99	6	240	7,769	8,114	1.22	.07	2.96	95.75	100
1928:												
Metal mines	68,237	268.07	227	15	439	17,611	18,292	1.24	.08	2.40	96.28	100
Quarries	38,760	164.45	77	8	199	6,090	6,374	1.21	.13	3.12	95.54	100
1929:												
Metal mines	73,325	258.71	292	15	338	18,325	18,970	1.54	.08	1.78	96.60	100
Quarries	35,790	174.66	78	4	167	6,002	6,251	1.25	.06	2.67	96.02	100
1930:												
Metal mines	57,311	224.36	237	20	401	12,200	12,858	1.84	.16	3.12	94.88	100
Quarries	30,001	157.53	74	9	161	4,482	4,726	1.56	.19	3.41	94.84	100

TABLE 69.—*United States: Number of men killed per thousand 300-day workers employed in mineral industries, 1913 to 1930*

Industry	1913	1914	1915	1916	1917	1918	1919	1920	1921
Coal mines	4.70	4.66	4.44	3.93	4.25	3.94	4.27	3.78	4.20
All metal mines	3.72	3.92	3.89	3.62	4.44	3.57	3.47	3.16	3.09
Copper	4.08	3.85	3.72	3.64	5.88	3.45	3.54	3.43	3.70
Gold, silver, and miscellaneous metal	3.83	4.06	4.79	4.05	4.03	4.27	4.41	4.20	3.29
Iron	3.29	3.78	2.88	3.41	3.54	3.45	3.09	2.34	3.04
Lead and zinc (Mississippi Valley)	3.90	4.32	5.37	3.14	4.09	3.58	4.13	3.27	2.58
Nonmetallic mineral	3.02	3.72	2.43	3.00	2.48	1.67	1.65	2.89	1.98
All quarries (including outside works)	2.10	2.64	1.80	2.26	1.83	2.11	1.93	2.31	2.00
Cement rock	2.99	3.95	1.60	2.38	2.99	2.14	2.66	2.75	1.91
Granite	1.47	3.36	2.27	1.86	1.54	2.10	1.81	2.06	2.57
Limestone	2.13	2.38	1.70	2.36	1.79	1.79	1.97	2.58	1.97
Marble	1.81	2.72	1.00	1.16	.57	2.14	.51	.92	1.49
Sandstone and bluestone	1.32	1.45	.93	1.28	.99	2.38	.76	.56	1.25
Slate	3.05	2.99	2.02	2.62	1.31	3.16	1.78	1.49	1.40
Trap rock	2.40	2.49	3.46	4.45	2.61	4.47	2.56	2.61	2.88
All quarries (excluding outside works)	-------	-------	2.17	2.32	2.00	2.19	2.29	2.81	2.22
All quarries (outside works only)	-------	-------	1.05	2.15	1.53	1.98	1.34	1.59	1.68
Metallurgical plants:									
Ore dressing	.99	1.51	1.57	1.41	1.93	1.55	1.48	1.25	.50
Smelters	1.93	1.02	1.05	.73	1.05	.92	1.09	.66	.99
Auxiliary works	-------	-------	-------	.89	.94	.85	.31	1.08	1.08
All coke ovens	1.97	2.12	1.21	1.32	2.14	2.06	1.92	1.64	1.23
Beehive	-------	-------	.65	1.29	1.30	1.16	.92	1.09	1.76
By-product	-------	-------	1.75	1.35	3.13	2.84	2.55	1.92	1.09

TABLE 69.—*United States: Number of men killed per thousand 300-day workers employed in mineral industries, 1913 to 1930*—Continued

Industry	1922	1923	1924	1925	1926	1927	1928	1929	1930
Coal mines	4.90	4.39	4.80	4.65	4.50	4.43	4.64	4.54	5.00
All metal mines	3.54	3.01	3.51	2.99	3.47	3.10	2.50	3.03	2.92
Copper	3.00	3.11	3.55	1.94	3.45	3.46	3.03	3.03	2.76
Gold, silver, and miscellaneous metal	5.35	3.93	4.99	3.83	3.27	3.91	2.60	3.66	4.49
Iron	3.00	2.38	2.95	2.54	4.23	2.45	2.16	2.98	2.68
Lead and zinc (Mississippi Valley)	2.64	2.73	2.76	3.32	3.05	2.64	1.62	2.08	1.63
Nonmetallic mineral	2.39	2.67	1.94	1.71	2.62	2.19	2.13	2.29	.75
All quarries (including outside works)	1.92	1.68	1.63	1.78	1.87	1.63	1.46	1.65	1.53
Cement rock	2.27	1.67	2.26	1.78	1.51	.54	1.05	1.20	.86
Granite	1.42	.90	1.19	.96	2.23	2.53	1.17	2.49	1.44
Limestone	1.87	1.87	1.64	1.76	2.09	2.16	1.84	1.87	1.77
Marble	.43	.59	1.22	.56	1.67	.85	1.08	.79	1.07
Sandstone and bluestone	1.19	.48	1.88	3.32	1.03	1.51	1.02	.39	2.79
Slate	3.15	2.13	.57	2.60	2.09	2.19	1.24	.67	.47
Trap rock	3.36	3.35	1.84	4.13	2.40	2.90	3.13	4.07	5.30
All quarries (excluding outside works)	2.31	1.97	1.90	2.28	2.58	2.39	1.99	2.18	2.47
All quarries (outside works only)	1.38	1.26	1.24	1.22	1.11	.87	.99	1.18	.80
Metallurgical plants:									
Ore dressing	1.09	1.62	1.24	1.00	.75	1.08	1.21	1.19	.54
Smelters	.77	.64	.55	.64	.69	.82	.74	.86	.34
Auxiliary works	1.21	.94	1.08	.41	.78	.84	.69	.41	.91
All coke ovens	1.59	1.76	1.16	1.16	2.10	1.08	.78	.86	1.22
Beehive	1.66	1.68	.75	.78	1.24	.65	1.32	1.17	.68
By-product	1.57	1.79	1.26	1.27	2.31	1.14	.72	.82	1.26

TABLE 70.—*United States: Number of men injured per thousand 300-day workers employed in mineral industries, 1913 to 1930*

Industry	1913	1914	1915	1916	1917	1918	1919	1920	1921
Coal mines [1]									
All metal mines	179.59	211.87	248.56	250.64	240.97	237.09	233.60	242.02	249.69
Copper	230.80	312.19	322.01	319.58	313.35	322.12	309.60	323.20	317.53
Gold and miscellaneous metal	70.37	126.90	201.49	190.79	172.51	185.18	191.29	204.82	225.46
Iron	268.31	224.07	233.51	240.17	227.54	185.45	202.35	200.49	210.91
Lead and zinc (Mississippi Valley)	133.51	189.01	238.27	263.09	272.99	319.54	292.28	327.97	379.67
Nonmetallic mineral	84.86	99.75	107.78	144.70	123.58	104.69	139.27	161.88	215.47
All quarries (including outside works)	88.81	114.92	117.30	175.62	185.14	147.07	144.20	145.51	174.54
Cement rock	207.99	226.20	148.25	248.83	277.73	238.65	231.58	182.49	213.50
Granite	69.60	109.21	96.72	143.99	189.73	109.68	124.70	130.53	134.09
Limestone	89.05	114.23	127.43	176.10	175.52	141.34	134.05	143.11	178.51
Marble	68.67	121.31	93.80	125.20	100.20	58.02	75.26	91.98	100.87
Sandstone and bluestone	74.36	69.08	66.56	127.86	118.89	148.04	131.96	100.56	156.22
Slate	18.81	28.61	33.08	85.00	112.04	96.29	98.51	108.20	135.18
Trap rock	87.77	152.56	232.85	237.84	222.92	205.17	186.47	208.89	229.92
All quarries (excluding outside works)			127.57	158.63	162.95	148.29	146.65	139.62	167.09
All quarries (outside works only)			96.90	206.06	223.81	145.03	140.28	154.04	185.79
Metallurgical plants:									
Ore dressing	122.38	94.19	109.65	135.66	121.12	139.54	122.21	156.07	151.05
Smelters	174.71	175.44	157.69	195.61	152.88	148.40	141.46	136.37	149.89
Auxiliary works				142.10	169.33	139.63	101.29	113.92	138.54
All coke ovens	107.73	103.06	90.78	153.49	188.59	219.64	145.66	114.13	133.62
Beehive			39.84	100.37	94.43	131.11	125.96	102.54	118.52
By-product			140.00	217.09	300.06	296.06	158.33	120.04	137.50

[1] Injury rates not available prior to 1930.

TABLE 70.—*United States: Number of men injured per thousand 300-day workers employed in mineral industries, 1913 to 1930*—Continued

Industry	1922	1923	1924	1925	1926	1927	1928	1929	1930
Coal mines [1]									251.40
All metal mines	268.48	265.18	278.04	283.53	245.01	221.54	205.61	200.11	167.86
Copper	320.78	349.09	347.82	350.62	288.30	261.16	220.99	223.83	193.48
Gold and miscellaneous metal	260.29	298.87	297.80	307.42	299.50	279.77	268.72	269.36	239.69
Iron	177.44	150.23	151.01	159.43	133.93	114.64	98.13	89.58	81.42
Lead and zinc (Mississippi Valley)	464.23	495.65	464.16	468.07	304.20	297.67	295.65	238.29	176.55
Nonmetallic mineral	247.51	212.47	178.74	165.40	190.74	171.20	168.60	168.05	138.25
All quarries (including outside works)	171.93	176.04	175.03	169.67	160.28	162.92	129.95	128.14	108.22
Cement rock	191.08	213.71	169.13	103.55	85.72	69.15	48.76	43.48	34.10
Granite	147.21	177.99	195.73	202.52	185.12	217.90	181.48	163.85	143.06
Limestone	177.72	169.31	173.58	193.47	200.66	209.36	166.02	171.46	142.78
Marble	127.76	127.88	131.89	116.04	144.81	124.83	110.38	95.62	91.41
Sandstone and bluestone	100.63	119.42	169.09	200.31	161.67	190.00	160.50	134.99	121.51
Slate	127.40	149.11	159.98	168.98	182.72	184.29	158.87	164.55	152.14
Trap rock	258.01	228.47	234.39	324.87	249.57	250.89	205.78	218.93	188.34
All quarries (excluding outside works)	177.16	178.11	178.00	195.02	187.46	193.50	162.46	172.48	155.06
All quarries (outside works only)	164.76	173.05	170.61	141.06	131.01	132.17	100.34	89.21	71.76
Metallurgical plants:									
Ore dressing	179.51	172.44	156.03	130.66	131.95	115.13	116.29	102.34	79.15
Smelters	143.71	130.71	112.65	113.83	109.50	85.68	78.40	75.56	52.96
Auxiliary works	120.26	132.37	137.43	107.96	93.70	92.06	81.93	83.98	59.23
All coke ovens	93.77	101.18	79.54	70.51	79.13	55.33	46.61	51.66	44.56
Beehive	98.28	122.48	113.54	96.89	133.07	93.45	70.21	82.55	71.04
By-product	92.15	92.95	71.33	63.34	65.69	49.52	43.85	48.24	42.75

[1] Injury rates not available prior to 1930.

TABLE 71.—*United States: Metal mines, coal mines, and quarries: Principal causes of fatalities, showing percentage due to each cause, 1912 to 1930*

Industry	Cause of death								Total
	Falls of overburden, roof, quarry material, ore, or coal	Explosives	Haulage and handling rock, ore, or coal	Falls of persons	Electricity	Machinery	Gas and dust explosions	Other causes	
1912:									
Metal mines	34.52	14.22	10.28	13.91	3.78	3.78	.....	19.51	100
Coal mines	49.03	6.08	19.14	1.36	3.64	1.65	11.99	7.11	100
Quarries	17.37	22.06	27.70	8.92	1.88	11.74	.....	10.33	100
1913:									
Metal mines	34.70	13.03	12.88	12.30	3.81	4.39	.....	18.89	100
Coal mines	45.39	4.95	18.31	1.80	3.16	1.80	18.45	6.14	100
Quarries	14.75	24.04	23.50	9.29	2.73	12.57	.....	13.12	100
1914:									
Metal mines	36.32	10.73	10.20	16.10	3.04	2.50	.....	21.11	100
Coal mines	46.09	5.95	18.78	2.85	4.08	1.87	14.22	6.16	100
Quarries	29.45	19.44	18.33	12.78	1.67	6.11	.....	12.22	100
1915:									
Metal mines	36.71	14.10	10.49	15.92	2.53	1.99	.....	18.26	100
Coal mines	47.55	6.83	18.64	1.36	4.36	1.68	13.40	6.18	100
Quarries	30.40	18.92	15.55	11.48	2.03	9.46	.....	12.16	100
1916:									
Metal mines	32.28	12.77	10.04	14.64	3.73	2.58	.....	23.96	100
Coal mines	47.85	6.56	20.59	1.39	4.35	1.89	10.15	6.92	100
Quarries	19.08	16.18	19.66	8.09	4.05	16.76	.....	16.18	100
1917:									
Metal mines	26.17	9.27	10.33	13.15	2.23	2.00	.....	36.85	100
Coal mines	45.63	4.08	22.17	.78	3.56	2.41	13.35	8.02	100
Quarries	18.32	16.03	24.43	11.45	1.52	15.27	.....	12.98	100
1918:									
Metal mines	29.72	13.78	13.00	12.85	3.87	3.25	.....	23.53	100
Coal mines	50.16	5.23	24.19	.81	3.99	2.21	5.00	8.41	100
Quarries	14.40	13.60	24.80	12.00	3.20	14.40	.....	17.60	100
1919:									
Metal mines	38.46	10.26	10.90	16.02	3.42	4.27	.....	16.67	100
Coal mines	47.66	8.86	20.44	.86	3.36	2.07	8.22	8.53	100
Quarries	12.19	19.51	25.20	6.51	4.07	16.25	.....	16.27	100

TABLE 71.—*United States: Metal mines, coal mines, and quarries: Principal causes of fatalities, showing percentage due to each cause, 1912 to 1930*—Continued

Industry	Cause of death								Total
	Falls of overburden, roof, quarry material, ore, or coal	Explosives	Haulage and handling rock, ore, or coal	Falls of persons	Electricity	Machinery	Gas and dust explosions	Other causes	
1920:									
Metal mines	33.41	13.41	14.11	10.59	4.24	4.24	.....	20.00	100
Coal mines	49.91	5.77	21.40	1.19	4.09	2.73	7.04	7.87	100
Quarries	18.54	20.23	25.84	7.30	3.93	11.80	.....	12.36	100
1921:									
Metal mines	31.30	10.00	10.00	17.39	1.74	2.61	.....	26.96	100
Coal mines	51.38	7.12	19.35	.90	4.86	1.70	6.32	8.37	100
Quarries	16.67	14.17	17.50	9.17	7.50	15.83	.....	19.16	100
1922:									
Metal mines	30.52	8.72	11.63	13.95	2.04	3.20	.....	29.94	100
Coal mines	45.77	4.68	19.91	.71	4.18	2.07	15.68	7.00	100
Quarries	18.94	27.27	12.88	5.30	4.55	18.94	.....	12.12	100
1923:									
Metal mines	30.25	11.44	17.44	13.62	3.27	3.27	.....	20.71	100
Coal mines	47.40	4.67	19.21	.90	3.37	1.99	15.11	7.35	100
Quarries	21.68	8.39	23.08	11.19	.70	14.68	.....	20.28	100
1924:									
Metal mines	31.34	12.44	15.79	10.53	3.11	2.15	.....	24.64	100
Coal mines	44.32	4.17	17.53	.63	4.05	1.55	22.37	5.38	100
Quarries	18.84	11.60	18.12	11.59	3.62	15.22	.....	21.01	100
1925:									
Metal mines	31.26	14.02	16.18	12.12	5.39	2.16	.....	18.87	100
Coal mines	48.34	4.57	17.95	.67	4.48	2.01	15.44	6.54	100
Quarries	22.82	13.43	16.78	10.07	4.02	18.12	.....	14.76	100
1926:									
Metal mines	29.30	11.39	10.48	11.39	4.88	1.39	.....	31.17	100
Coal mines	48.19	3.85	19.17	.52	4.45	1.39	16.75	5.68	100
Quarries	20.78	14.94	17.53	5.84	7.14	12.99	.....	20.78	100
1927:									
Metal mines	29.26	10.51	13.35	15.06	2.84	4.83	.....	24.15	100
Coal mines	51.50	4.93	17.98	.45	5.11	1.70	11.07	7.26	100
Quarries	28.15	13.33	15.56	8.89	5.19	14.81	.....	14.07	100
1928:									
Metal mines	32.24	7.69	14.65	12.45	3.67	2.93	.....	26.37	100
Coal mines	49.08	3.40	18.48	.41	4.27	1.79	17.28	5.29	100
Quarries	24.37	7.56	15.13	15.97	5.88	17.65	.....	13.44	100
1929:									
Metal mines	35.14	10.86	14.86	11.71	2.29	3.14	.....	22.00	100
Coal mines	54.05	4.02	20.76	.87	4.30	1.87	8.92	5.21	100
Quarries	15.08	13.49	20.64	9.52	4.76	17.46	.....	19.05	100
1930:									
Metal mines	30.63	14.39	11.44	14.39	3.69	2.58	.....	22.88	100
Coal mines	.....	.....	.....	.....	.....	.....	.....	.....	100
Quarries	22.86	13.33	15.23	8.57	3.81	18.10	.....	18.10	100

EXPLOSIVES

Table 72 gives data on explosives used in metal mines for the 5 years from 1926 to 1930.

TABLE 72.—*Explosives used in metal mines in the United States, 1926 to 1930 (pounds)*

Year	Total quantity	Black blasting powder	Permissible explosives	Other high explosives
1926	113,439,237	2,849,200	216,000	110,374,037
1927	104,469,220	2,155,900	191,175	102,122,145
1928	98,413,474	2,094,525	230,654	96,088,295
1929	111,389,377	2,285,250	165,312	108,938,815
1930	92,732,820	1,388,475	183,294	91,161,051

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