RESCUE AND RECOVERY WORK AFTER MINE EXPLOSIONS AND FIRES.

During the year the value of oxygen breathing apparatus, both for rescue and recovery work after explosions and for fighting mine fires, has been shown on numerous occasions. The use of such apparatus has increased both in the coal fields and in the metal mining districts.

The possibilities and also the limitations of the existing types of the apparatus are being much more generally understood, and recovery and rescue work after mine disasters is becoming largely systematized. At five of the accidents investigated by bureau representatives during the past fiscal year, rescue apparatus owned by the Government was worn during recovery and rescue work. One fatality happened when an employee of a mining company became excited because breathing was a little difficult and pulled off his mouthpiece; one of the other men of the party struggled with him and got his mouthpiece replaced and removed him to the surface.

ACCIDENTS IN WHICH LIVES WERE SAVED.

Summarized accounts of accidents at which lives were saved are given below.

JULY 10, 1917, EXPLOSION AT THE ROCK SALT CORPORATION SHAFT, ITHACA, N. Y.

In a gas explosion at the bottom of the shaft at 12.30 a. m. one of the two men in the mine lost his life. Thirteen men had been hoisted out of the shaft 10 minutes before the explosion. From the time of the explosion until the rescue party of the Bureau of Mines arrived, at 9.30 p. m., nothing had been done toward recovery, except to try to force fresh air into the shaft. The necessary examinations were made by the Bureau of Mines party which started down the shaft without using apparatus. At the bottom of the shaft one man was found alive, caught by the leg by some timber; he was freed and taken to the surface. The party started to recover the body of the other man, and brought it to the surface about two hours later.

DECEMBER 30, 1917, EXPLOSION IN THE ACME MINE OF THE ACME BY-PRODUCT COAL CO., AT FLEMING, KY.

Four men entered the mine on a Sunday to blast some holes; after the holes were loaded and lighted they started to leave the mine, but when they were about 500 feet from the point of blasting, all the holes went off at about the same time. A rush of wind down the entry caught the men and extinguished their carbide lights. Two men jumped into a room and the other two stayed on the entry. The rush of wind was followed by a gust of flame. The two men that stayed in the entry were badly burned, but were able to make their way out of the mine, where they were found by a rescue party. The rescue party found the other two men, both badly burned, in the room into which they had gone. Their lights had been put out by the explosion and they had become so badly confused that they were unable to find their way out. All four men had entered the mine without the consent of the mine officials.

JANUARY 5, 1918, MINE CAVE IN THE BARNUM MINE OF THE PENNSYLVANIA COAL CO., PITTSTON, PA.

By a cave, covering approximately five acres, at 7:40 a. m. two men were killed and 15 injured. Five of the men were rescued 10 hours after the accident.

JANUARY 28, 1918, SHOT-FIRER'S ACCIDENT IN THE LUTIE MINE OF THE HAILEY-OKLAHOMA COAL CO., LUTIE, OKLA.

Two shot firers, the only men in the mine at the time, lost their lives. The recovery of the bodies was most dangerous and difficult work on account of the heavy pitch of the stope (38°), and 6 to 10 feet of loose slate underfoot caused by the ground caving after the timber had been blown out by the explosion. Rescue apparatus was used in recovering the bodies. Two men not wearing apparatus were overcome by gas. In a short time they were rescued and revived by oxygen apparatus.

FEBRUARY 21, 1918, RUSH OF WATER AND SAND IN THE AMASA-PORTER MINE OF THE NEVADA MINING CO., CRYSTAL FALLS, MICH.

Seventeen men were killed, 3 escaped unassisted, and 1 was rescued after a rush of water and sand broke into the mine through a shaft or bulkhead. The first cage load of men had been unloaded at the 550-foot level and the second cage was being lowered to that level at the bottom of the shaft, when the engineer, noticing an additional loading manifested through the effect on the hoisting engine, immediately tried to hoist the cage, but could not with a full head of steam. Four of the men climbed up the shaft ladders, 3 reaching the surface unassisted and 1 being rescued. Pumps were started in the expectation of getting the water out in a short time and rescuing the men who, it was hoped, had climbed up into a high stope. Meantime the air compressors were kept going to furnish to the imprisoned men air. February 25, at 7.55 p. m., a second rush of water drowned out the pump, raising the water in the shaft above the level of the highest stopes. All hope for rescue was then abandoned.

APRIL 28, 1918, POWDER GAS AFTER BLASTING, IN THE MOUNTAIN KING MINE OF THE MOUNTAIN KING MINING CO., MOUNTAIN KING, CAL.

The men entered the mine in the morning to do some repair work on the 1,200-foot level; as the power was off, they agreed that nobody should go below level. Soon after two miners started to climb down the winze to the 1,400-foot level to see the results of blasting done five hours before by the night shift. Alarmed by the men's not returning in about 30 minutes, the foreman went down to investigate. He returned shortly, reported that the two men had been overcome by powder smoke, and went back with two men to try to rescue the others; all were overcome by gas. Three other men who went down were also caught. The superintendent and rescue party started work but were able to get out only one man who recovered. Several attempts to remove the gas failed. About 7 o'clock in the evening power was turned on, the air compressors started, the gas blown out, and bodies recovered. Had oxygen breathing apparatus been available, probably all of the lives could have been saved.

JUNE 17, 1918, CAVE OF GROUND IN THE SHORT MOUNTAIN COLLIERY OF THE SUSQUEHANNA COLLIERY CO., LYKENS, PA.

Five men were standing timber, when without warning the ground caved, catching all five. One man was able shortly to free himself and went for assistance. Soon a rescue party arrived. In a short time the party got a man out; with medical assistance his life was saved. The next three men were alive when removed but died soon after; the last man was dead when taken from under the fall.

The following table shows the number of accidents investigated during each calendar year since Government investigation of mining accidents began in 1907.

Accidents investigated by Bureau of Mines and number of persons killed and rescued, 1907–1918.

Item.	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	Jan. 1 to June 30, 1918.
Accidents investigated	12	16	25	25	35	47	73	65	92	62	48	23
Killed	1,106	445	574	722	663	334	634	440	452	259	601	80
Rescued by Bureau of Mines men	.....	2	29	20	13	7	19	2	a 43	1	6	7
Rescued by others	21	16	124	243	81	84	106	26	111	66	48	3
Escaped unassisted	5	33	403	132	18	117	100	1,127	2,392	1,544	463	15

a Includes 42 miners at Layland, W. Va., rescued jointly by Gary (W. Va.) crew, State inspectors, company officials, volunteer crews, and Bureau of Mines crew.

The accidents investigated during the fiscal year were in 16 States, as follows: Alabama, 1; Indiana, 5; New York, 1; Virginia, 1; Arkansas, 1; Kentucky, 3; Oklahoma, 5; Washington, 1; California, 2; Michigan, 3; Pennsylvania, 6; West Virginia, 1; Illinois 4; Minnesota, 2; New Mexico, 1; Tennessee, 1.

A tabulation of the number of accidents investigated from January 1, 1917, to June 30, 1918, classified by States, is given below:

Number of mine disasters or serious accidents investigated, by States, 1907–1918.

State.	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	Jan. 1 to June 30, 1918.	Total.
Alabama	1	.....	1	3	1	2	2	3	2	4	2	.....	21
Arizona	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1
Arkansas	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	2	1	5
California	.....	.....	.....	.....	.....	.....	1	1	1	7	.....	2	12
Colorado	1	.....	.....	5	4	6	4	2	1	.....	1	.....	24
Idaho	.....	.....	.....	.....	1	2	1	.....	.....	.....	1	.....	5
Illinois	2	4	7	2	.....	2	1	4	9	6	6	2	45
Indiana	.....	.....	2	1	1	2	9	7	12	4	5	4	47
Iowa	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1
Kansas	.....	.....	.....	.....	1	4	4	10	10	5	4	.....	38
Kentucky	.....	.....	1	4	1	3	5	2	1	.....	4	.....	21
Maryland	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1
Michigan	.....	.....	.....	.....	2	1	4	4	1	2	3	1	18
Minnesota	.....	.....	.....	.....	.....	.....	1	1	1	.....	1	1	5
Missouri	.....	.....	.....	.....	1	.....	.....	2	3	1	.....	.....	7
Montana	.....	.....	.....	.....	1	.....	.....	1	2	4	2	.....	10
Nevada	.....	.....	.....	.....	2	.....	.....	1	.....	1	.....	.....	4
New Jersey	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	2	.....	3
New Mexico	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	3
New York	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	2
Ohio	.....	.....	1	1	1	1	4	1	.....	1	.....	.....	10
Oklahoma	.....	2	3	4	5	9	5	7	10	2	3	4	54
Oregon	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1
Pennsylvania	2	6	6	2	6	10	24	10	25	16	7	5	119
Tennessee	.....	.....	1	.....	1	.....	1	2	.....	.....	1	.....	6
Utah	.....	.....	.....	.....	.....	.....	.....	1	2	.....	.....	.....	3
Virginia	.....	.....	.....	1	1	1	.....	.....	1	.....	.....	1	5
Washington	.....	.....	1	2	2	.....	1	.....	2	.....	2	.....	10
West Virginia	5	3	2	.....	4	3	2	5	7	4	.....	1	36
Wyoming	.....	1	.....	.....	.....	1	.....	.....	.....	3	1	.....	6
Total	12	16	25	25	35	47	73	65	92	62	48	23	523

GIBBS BREATHING APPARATUS.

During the year the Bureau of Mines continued tests of the new breathing apparatus designed by W. E. Gibbs, engineer of mine-safety investigations, which differs from the Fleuss and the Draeger apparatus in three distinct features: