base. After starting back Phillips collapsed, whereupon Lacey became panic-stricken and rushed toward the fresh-air base. The third man followed Lacey and tried to persuade him to return and assist Phillips to safety, but his panic increased. Lacey rushed past the opening leading to the outside of the sealed area, and traveled along an old airway containing numerous falls and many caves. After traveling for some distance along this old airway Lacey climbed on top of a fall and crawled along it until he became wedged tight. When a rescue party arrived to recover his body, it was necessary to cut the apparatus straps before the body could be extracted.

The survivor stated that, after trying to calm Lacey, he returned to Phillips and attempted to drag him to the fresh-air base but was unable to do so. He then returned to the fresh-air base but had to go out of the mine to get assistance. Considerable time elapsed before the bodies of Phillips and Lacey were recovered.

After the foregoing was published in 1944, the Bureau of Mines received a letter from a man who should have been in a position to know the facts of this case. His version is as follows:

> Lacey, who was quite experienced in wearing breathing apparatus, did not become panic stricken. He was investigating conditions to find a less-obstructed way from the fire to the fresh-air base. In so doing, Lacey was climbing over a fall on top of a large slab of rock which was considerably tilted. He slid down this slab of rock and his breathing apparatus became wedged against another rock and he could not free himself.
>
> The surviving member of this party of three, J. O. Smith, did not go out of the mine for assistance, as 11 men were stationed at the fresh-air base not more than 25 feet from Reese Phillips' body. The time elapsed before assistance came was not more than 5 minutes, and Phillips' body was removed immediately to fresh air, where he was given artificial respiration and an inhalator was used for more than an hour.
>
> Others of the party went immediately to Lacey's rescue, but owing to the difficulty experienced in freeing his body and the time consumed in building ladders and crawlways, about 1-1/2 hours had elapsed before Lacey's body was brought to the fresh-air base.

Arthur Kaemmerer

On March 28, 1955, Arthur Kaemmerer, 40 years of age, was asphyxiated in the Little Oak mine, Belleville, Ill. He was an experienced salvage operator and not a mining man. The fan was in operation and ventilation had been partly reestablished for about 3,000 feet inby the shaft bottom. Kaemmerer had obtained the help of Andrew Yuengel, who was regularly employed at a nearby coal mine, in further exploring the Little Oak mine preparatory to salvaging rails, wire, etc.

On the morning of March 28 Kaemmerer and Yuengel entered the mine through the main shaft, leaving two workmen on the surface. The purpose of the trip was to explore part of the main west haulage road. Each man carried a carbide lamp, a permissible electric cap lamp, and a nonpermissible Bendix back-type oxygen demand mask equipped with a 38-cubic-foot oxygen tank. In addition, Yuengel carried a permissible flame safety lamp.

About 3,000 feet from the shaft bottom the flame of the safety lamp went out because of oxygen deficiency. When this happened the oxygen demand masks were put on, and the investigation continued for about 20 minutes more before the men turned back. After traveling about 100 feet Yuengel's oxygen supply was exhausted. He removed his mask and staggered another 100 feet, with some help from Kaemmerer, and then collapsed. Kaemmerer tried to pick Yuengel up, but found he was unable to stand. Yuengel told Kaemmerer to go on out and get help. Yuengel rested on the mine floor for about 15 minutes without losing consciousness and then struggled back about another 100 feet. He kept resting and retreating in this manner for about 600 feet toward the shaft, at which point he found Kaemmererfs body. His hasty examination convinced him that Kaemmerer was dead, so he resumed his tedious journey to the shaft, alternately resting and traveling. Upon reaching the shaft bottom he signaled the men on top by hammering on the bucket used for entering the mine. The top men lowered the cable, which Yuengel hooked to the bucket, and he was hoisted to the surface. He sent one of the top men for help, and several hours later two mine rescue teams arrived, and Kaemmerer's body was brought to the surface.

This accident varies considerably from others covered in this publication, but it is an excellent illustration of what not to do when entering an abandoned mine. Any person intending to enter an abandoned mine should follow the advice of people having knowledge and experience in such procedure. In many States it is unlawful to enter or reopen abandoned mines without the guidance of a State mine inspector.

THE THREE PERIODS

The 26 accidents resulting in 35 fatalities covered herein fall naturally into three groups (see table 1). The first group of 20 accidents involving 26 fatalities occurred between December 24, 1908, and December 31, 1921, covering 13 years. The second group of 5 accidents involving 8 fatalities occurred from January 1, 1922, to October 6, 1940, covering nearly 19 years. The third and last period, from October 1940 to July 1959, covers nearly 19 years, in which there was only 1 fatality.

The first period in which the average was about 2 lives lost each year is the important one, because it was during these years of trial and error that the lessons were learned and the rules established which have since made the wearing of oxygen breathing apparatus in irrespirable atmosphere much safer. During these 13 years, 13 men lost their lives while wearing Draeger 2-hour apparatus, and the stories of some of these fatal accidents indicated certain fundamental weaknesses in the type of Draeger apparatus then in use. Six men lost their lives while wearing Fleuss 2-hour apparatus. There were 4 additional deaths in which the type apparatus worn is unknown; however, from the