

volumes of nitrogen, 16.04 of oxygen, and 4 of carbonic acid. From this, it can be seen that about the same quantity of carbonic acid is given off as there is oxygen absorbed. In other words, in respiration, only 4 per cent. of the oxygen inhaled is taken up by the blood passing through the lungs, the remainder being exhaled without being utilized. To replace this loss of oxygen, there is added to the exhaled air 4 per cent. of carbon dioxide. With physical exertion, the amount of carbon dioxide is increased. It is this gas which, when it accumulates in too large a quantity, becomes a source of trouble, and has therefore to be removed. When more than 1 per cent. is present it causes headache and a sense of distress. Therefore, in all forms of rescue apparatus depending upon oxygen for their gas supply, provision is made for the absorption of the carbon dioxide by passing it through caustic potash or caustic soda. The air thus purified, passes on through the apparatus, and, at a particular point in its circuit, meets and mixes with the oxygen coming from one of the supply cylinders.

GROUP I—PORTABLE APPARATUS WITH SELF-CONTAINED GAS SUPPLY

This group may, for convenience, be classified into those depending on:

1. Compressed oxygen supply—
 - (a) Constant supply—Draeger, Fleuss, Meco, Westfalia, etc.
 - (b) Automatic supply—Weg.
2. Liquid air supply—Aerolith.
3. Compressed air supply—Vanginot.
4. Oxygen supply generated from sodium-potassium peroxide—Hall-Rees and Pneumatogen.

1. *Compressed Oxygen Supply*

(a) **CONSTANT SUPPLY TYPE.**—In the constant supply type, the oxygen is stored in cylinders capable of containing 260-290 litres at 120 atmospheres. It is supplied for breathing purposes, by means of a reducing valve, set to give a constant supply. In some of the apparatus of this type, the reduction of pressure is utilized by means of an injector for circulating the gas continuously through the breathing bag and regenerators, while, in others, the oxygen, after being reduced in pressure, simply passes direct to the breathing and regenerating bag.

(b) **AUTOMATIC SUPPLY TYPE.**—In the automatic supply type the oxygen is carried in cylinders in the usual way and, by a combination of reducing valves, is liberated automatically in accordance with the amount of exertion.

2. *Liquid Air*

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4. *Oxygen*

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