standard The criteria package is only *proposed,* as of the date of publication of this Manual, but it is possible that the final standard may not differ substantially Therefore, establishments that have suspected or known heat problems should assemble the equipment necessary to determine the WBGT Index, and determine the WBGT profiles for both winter and summer conditions at workplaces

Experience has shown that men do not stand a hot job very well at first, but develop tolerance rapidly and acquire full endurance in a week to a month

Atmospheric pressure

It has been recognized from the beginning of caisson work, about 1850, that men working under pressures greater than normal atmospheric are subject to various ills connected with the job The main effect (decompression sickness commonly known as the "bends") results from the release of nitrogen bubbles into the circulation and tissues during decompression The bubbles lodge at the joints and under muscles, causing severe cramps To prevent this trouble, decompression is carried out slowly and by stages so that the nitrogen can be eliminated slowly and without the formation of bubbles

Deep-sea divers are supplied with a mixture of helium and oxygen for breathing Since helium is an inert diluent and is less soluble in blood and tissue than is nitrogen, it presents a less formidable decompression problem

Under some conditions of work at high pressure, the concentration of carbon dioxide in the atmosphere may be considerably increased so that the carbon dioxide will act as a narcotic Keeping the oxygen concentration high will minimize the condition although not prevent it This procedure is useful where the carbon dioxide concentration cannot be kept at a proper level

One of the most common troubles encountered by workers under compressed air is pain and congestion in the ears from inability to ventilate the middle ear properly during compression and decompression As a result, many workers under compressed air suffer from temporary and some from permanent loss of hearing The cause of this damage is considered to be obstruction of the Eustachian tubes which prevents proper equalization of pressure on the middle ear

The effects of reduced pressure on the worker are much the same as the effects of decompression from a high pressure If pressure is reduced too rapidly, decompression sickness and ear disturbances similar to, if not identical with, the diver's conditions may result.

Men working at reduced pressure are also subject to oxygen starvation, which can have very serious and insidious effects upon the senses and judgment There is a considerable amount of evidence that exposure for 3 to 4 hr to an altitude of 9000 ft above sea level without breathing an atmosphere enriched in oxygen can result in severely impaired judgment Even if pure oxygen is provided, the altitude should be limited to that giving the same partial pressure of oxygen as air at 8000 ft

Reduced pressure is not the only condition under which oxygen starvation may occur Deficiency of oxygen in the atmosphere of confined spaces is commonly experienced in industry For this reason, the oxygen content of any tank or other confined space should be checked before entry is made Instruments such as the oxygen analyzer are commercially available for this purpose (See Fig 37–7)

Normal air contains approximately 21 percent oxygen by volume The first physiologic signs of a deficiency of oxygen (anoxia) are increased rate and depth of breathing Oxygen concentrations of less than 16 percent by volume cause dizziness, rapid heart beat, and headache One should never enter or remain in areas where tests have indicated such concentrations unless he is wearing some form of supplied-air or self-contained respiratory equipment (Equipment for use in oxygen-deficient atmosphere is discussed in Chapter 19, "Personal Protective Equipment")

Oxygen-deficient atmospheres may cause inability to move and a semiconscious lack of concern about the imminence of death In cases of sudden entry into areas containing little or no oxygen, the individual usually has no warning symptoms, but immediately loses consciousness and has no recollection of the incident if he is rescued and revived