cooled oxygen tent, high temperatures and humidities are inevitable, increasing the discomfort of the patient and imposing an added strain on an already overburdened heart. Oxygen therapy under such conditions may do more harm than good[14]. An ice melting rate of about 10 lb per hour gives satisfactory results in patients with fever in a medium size tent.

Oxygen tents are somewhat confining to the patient; the restless type of person is difficult to control, and the delirious impossible to control. Medical and nursing care is complicated, as the tent must be opened or removed with attendant loss of oxygen. Oxygen concentrations of 50 per cent or more are difficult to maintain, and it is a problem to keep the temperature and humidity low enough in hot weather. The direct advantages are portability and low cost.

Oxygen Chambers: The conventional oxygen chamber is an air-tight sheet metal enclosure of fire-proof construction, large enough to accommodate one or two patients. Trap doors or curtains are provided for the personnel, food and service to avoid loss of oxygen. Glass windows in the ceiling and walls admit light from electric fixtures outside the chamber.

The air conditioning system may be of the gravity type, or of the fan type using mechanical refrigeration or silica gel for drying the air. The gravity system includes a bank of brine coils controlled thermostatically, which dehumidify and cool the air. The cool air falls over trays at the bottom of the coils, containing soda lime to remove the carbon dioxide given off by the occupants. A heater at the base of the opposite wall warms the air to the desired temperature. Ordinary industrial oxygen is introduced from storage tanks outside the chamber and the concentration is regulated according to the prescription of the physician. The only change of air in the chamber is that taking place by leakage through trap doors.

The chief objections to the gravity circulation system are stratification of cold air near the floor and accumulation of odors, which may require the use of activated charcoal or an excess of oxygen for deliberate aeriation.

The fan circulation systems include compact extended surface coolers, heaters, and sometimes silica gel beds installed outside the chamber for the removal of moisture. A spray dehumidifier is not suitable for this purpose because it is often desired to cool the air below 32 F in order to obtain low relative humidities.

The temperature and humidity requirements in oxygen therapy depend primarily upon the physical condition of the patient, and secondarily upon the type of disease. In pneumonias, the range of satisfactory conditions is placed between 60 and 75 F with 20 to 50 per cent relative humidity, depending on the condition of the patient.

Oxygen chambers are unquestionably more comfortable than oxygen tents. The patients receive unhampered medical and nursing care, and the oxygen concentration, the temperature and humidity can be adequately controlled at any desired level. The chief disadvantage is high initial and operating costs in comparison with oxygen tents or with the nasal catheter method of oxygen administration. The nasal catheter

[14]General Measures Employed in the Treatment of the Pneumonias, by J. G. M. Bullowa (*Health Examiner* 5:12, 1936).

method is the simplest and most inexpensive of all but it may cause considerable discomfort to the patient and it is not satisfactory for continuous administration and in restless or delirious patients. Moreover, oxygen concentrations greater than 40 per cent in the inspired air are difficult to obtain.

The chamber method is of value in large hospitals and for research and experimental purposes, but for routine oxygen therapy alone it may prove a liability rather than an asset in many hospitals.

GENERAL HOSPITAL AIR CONDITIONING

Complete conditioning of large hospitals involves a capital investment, depreciation and running expense which may not be justified.

In clean and quiet districts, the requirements of almost all general and private wards during the cool season of the year can be satisfactorily fulfilled by the use of rational heating in conjunction with window air supply and gravity or mechanical exhaust. Insulation against heat and sound is much more important than humidification in winter; it will also help considerably in keeping the building cool in warm weather. Excessive outside noise and dust may require the use of silencers and air filters in the window openings.

Cooling and dehumidification in warm weather are important. In new hospitals particularly, the desirability of cooling certain sections of the building should be given serious consideration. Financial reasons may preclude the cooling of the entire hospital, but the needs of the average hospital can be met by the use of built-in room coolers and a few portable units which can be wheeled from ward to ward when needed.

In the North and certain sections of the Pacific Coast, cooling is needed on but a few days during summer, while in the South, built-in room coolers can be used to advantage from May to October, and in tropical climates almost continuously throughout the year. Objectionable noise is an important drawback to the use of self-contained units, but the difficulty is gradually being overcome by improvements in design.

Aside from comfort and recuperative power of the patients, cooling is of great assistance in the treatment of pyrexias in the new-born and in post-operative cases, in enteric disorders, fevers, heat stroke, heart failure, and in a variety of other ailments which often accompany summer heat waves.

Considerable research is now in progress on the influence of air conditioning upon a wide variety of diseases such as pneumonia, upper respiratory diseases, tuberculosis, arthritis, nervous instability, hyperthyroidism, essential hypertension, skin diseases, vascular disorders, and others. The field is a fruitful one having many possibilities.

PROBLEMS IN PRACTICE

1 ● Where has air conditioning in hospital wards proved itself of sufficient value to justify the expense?

In nurseries for premature infants, anesthesia and operating rooms, oxygen therapy chambers, heat therapy rooms or cabinets and allergic wards.