

electroencephalographic effect. (Davidson, L. A., and Jefferson, J. M.: *Encephalographic Studies in Respiratory Failure, Brit. Med. J.* 2: 397 (Sept. 12) 1959.)

MANAGEMENT OF RESPIRATORY INSUFFICIENCY Using the Mörch respirator, ten patients were treated for pulmonary insufficiency. This followed trauma in one patient, pulmonary surgery in two, and cardiopulmonary bypass in seven patients. The advantages of this apparatus is that a large and certain stroke volume is available which can produce a slight hypocapnia and permits use of a loose tracheotomy tube. Five ml. of sterile saline is instilled into the tracheotomy every thirty minutes. One patient died from a diffuse tracheobronchitis. Pulmonary hypertension was present in five of the above mentioned seven patients, and it is noted that a degree of anoxia easily tolerated by patients with a normal pulmonary artery pressure may be fatal to a patient with severe pulmonary hypertension. (Spencer, F. C.: *Use of a Mechanical Respirator in the Management of Respiratory Insufficiency Following Trauma or Operation for Cardiac or Pulmonary Disease, J. Thoracic & Cardiovasc. Surg.* 38: 758 (Dec.) 1959.)

POSITIVE PRESSURE BREATHING Dogs subjected to 18.5 mm. Hg positive pressure showed a five-to-six fold increase in venous pressure as well as a decrease in mean arterial pressure. There was a progressive decrease in circulating plasma volume as measured by the T-1824 method. A 30 per cent decrease in plasma volume was recorded after 160 minutes of increased intrapulmonary pressure. All circulatory changes returned to pre-pressure breathing levels upon release of pressure breathing. Other changes such as oliguria, periods of apnea and an alkaline urine, accompanied positive pressure breathing. This suggests that the decrease in plasma volume is the result of venostasis caused by the rapid increase in venous pressure. (Sobel, S., Marotta, S. F., and Marbarger, J. P.: *Circulating Plasma Volume Changes in Anesthetized Dogs During Positive Pressure Breathing, J. Appl. Physiol.* 14: 937 (Nov.) 1959.)

GAS DISTRIBUTION The stratification theory suggests that the main factor causing nonuniform composition of alveolar gas is that more deeply situated spaces (alveoli) receive less inspired gas than more superficial spaces (alveolar ducts). The more recent theory, series ventilation, also assumes a superficial well-ventilated space and a deeper less-ventilated space without, however, giving a definite anatomical location of these spaces. The theory of parallel ventilation states that nonuniform gas distribution is due to the occurrence of separately located spaces which are ventilated at different rates independently of one another and in parallel. These theories are discussed at some length, and it is concluded that no explanation is completely satisfactory. A series element may be present at exceptionally high breathing rates, but regional ventilation differences probably account for most of the inequalities observed under physiological circumstances. Regional ventilation differences may be caused by a number of factors, the most commonly accepted ones being unequal volume expansion and differences in time constants of lung regions. Factors changing the extent of nonuniform distribution are: age and sex; breathing frequency; lung volume; hyperventilation; added dead space; posture; and drugs. It seems likely that the distribution of ventilation and blood flow within the lungs are even more dynamic processes than is apparent from the experimental results. The hydrostatic pressure effects in pulmonary circulation appear to be compensated, to some extent, by changes in gas distribution, but this compensation is insufficient to maintain uniform ventilation-to-perfusion ratios in the erect position. (Bouhuys, A., and Lundin, G.: *Distribution of Inspired Gas in Lungs, Physiol. Rev.* 39: 731 (Oct.) 1959.)

PULMONARY SHUNTS In patients without intracardiac shunts a rise in saturation during the Valsalva maneuver and a fall following the release of the maneuver was seen. The change averaged 1.2 per cent in normal subjects and varied from 3.9 to 7.3 per cent in patients with cardiac or pulmonary disease. The rise in saturation probably results from a decrease in blood flow through pulmonary

arteriovenous shunts secondary to the hemodynamic effects of the Valsalva maneuver. Those patients who showed a large rise in saturation had an abnormally large flow through such shunts at rest. These observations confirm the hypothesis that transmural pulmonary artery pressure is an important factor controlling flow through these shunts, and that an abnormally large shunt may develop in patients with chronic pulmonary hypertension. Evidence of shunt flow at rest was found in eight of nine normal subjects and averaged one per cent of total pulmonary blood flow. In patients with cardiac or pulmonary disease but without intracardiac shunts or signs of congestive heart failure, there was evidence of shunt flow at rest. Two patients with congestive heart failure showed no change in saturation, presumably because the Valsalva maneuver produced no hemodynamic change in the pulmonary circulation. In patients with congenital intracardiac shunts the arterial saturation changes represented a summation of changes in shunt flow within the lungs and across the congenital defect. (Jose, A. D., and Milnor, W. R.: *The Demonstration of Pulmonary Arteriovenous Shunts in Normal Human Subjects, and Their Increase in Certain Disease States*, *J. Clin. Invest.* 38: 1915 (Nov.) 1959.)

LUNG NITROGEN CLEARANCE Subjects breathing oxygen had a slower clearance of pulmonary nitrogen in the lateral decubitus position than when they were supine. This is the result of two factors. The total functional residual capacity is increased without an accompanying increase of total effective minute volume. The proportion of the total effective minute volume distributed to the underventilated fraction of the functional residual capacity is further reduced in the lateral positions. In the supine position, the tidal volume, dead space and functional residual capacity were greater for the right lung than for the left, but clearance rates and relative magnitude of slowly and rapidly ventilated regions of both lungs were similar. In lateral decubitus positions, the ventilatory pattern of the dependent lung was similar to that of the lung in the supine position. The superior lung had an increased functional residual ca-

capacity and a decreased tidal volume. The clearance rates of both rapidly and slowly ventilated components of a lung were only half as great when it was in the superior position as they were in the same lung when the subject was supine. The slow clearance rates of the superior lung appear to be responsible for the retardation of nitrogen clearance from the total lung observed in the lateral positions. This represents a regional type of uneven alveolar ventilation. These variations between lungs with change in position show that relatively retarded alveolar ventilation is not always restricted to a particular anatomic location. (Lillington, G. A., and others: *Nitrogen Clearance Rates of Right and Left Lungs in Different Positions*, *J. Clin. Invest.* 38: 2026 (Nov.) 1959.)

CYCLOPROPANE UPTAKE The measured concentrations of cyclopropane in expired air were compared with those predicted by Kety's equation describing the uptake of inert gases. Although fair agreement was found between the measured and predicted data, it was noted that the measured values increased more rapidly than theory predicted. This difference apparently resulted from Kety's simplifying assumption that the body consists of a homogeneous tissue mass. (Sechzer, P. H., Dripps, R. D., and Price, H. L.: *Uptake of Cyclopropane by the Human Body*, *J. Appl. Physiol.* 14: 887 (Nov.) 1959.)

SPONTANEOUS PNEUMOTHORAX Among 43 patients there were 19 with tension pneumothorax. Twenty-five per cent had recurrences. Forcible cough or strenuous physical effort are generally thought to be immediate causes; but in this series only three patients related onset to a fit of coughing and 11 patients related it to physical effort. Over half the patients developed the condition while at rest or asleep. (Anderson, I., and Poulsen, T.: *Surgical Treatment of Spontaneous Pneumothorax*, *Acta Chir. Scandinav.* 118: 105 (Dec.) 1959.)

ATROPINE SMOKE Atropine smoke from specially prepared low nicotine cigarettes was found to increase vital capacity significantly and provide subjective relief in trained sub-