anesthetic periods. Ventilation of one area of the lung decreases if the carbon dioxide concentration in that area is allowed to decrease by occluding its pulmonary blood supply. This may be a homeostatic mechanism to control the distribution of ventilation to those areas of the lung where blood flow is going. The cerebral blood flow is regulated, in part, by the carbon dioxide concentration in arterial blood. Inspiration of seven per cent carbon dioxide doubles the cerebral blood flow and hyperventilation may reduce the cerebral blood flow to 60 per cent of normal. The symptoms of hyperventilation are in part due to hypoxia of the brain, resulting from cerebral vasoconstriction. Carbon dioxide inhalation causes hyperpnea by an elevation of the P_{CO_2} in the respiratory center.

The electrolyte composition of the cerebral spinal fluid in the fourth ventricle plays a role in the control of respiration, slightly acid solutions stimulating and slightly alkaline solutions depressing ventilation. Carbon dioxide present in the brain contributes to the narcosis produced by nitrous oxide inhalation. The average nitrous oxide concentration required to produce loss of consciousness varied from 30 to 60 per cent when alveolar carbon dioxide was varied downward from nine to three per cent. *(Severinghaus, J.: Carbon Dioxide Tension and Perfusion in Tissue, Der Anaesthesist 9: 50 (Feb.) 1960.)*

CARBON DIOXIDE Experiments are shown which demonstrate the respiratory driving action of hydrogen ions in cerebrospinal fluid. A specific action of carbon dioxide at this location can be excluded. The action of cerebrospinal fluid hydrogen ions is not direct effect on centers but an influence on intracranial efferents to the centers. It can be eliminated by procaine introduced into the cerebrospinal fluid. *(Loeschcke, H. H.: Relationship Between Carbon Dioxide and Respiration, Der Anaesthesist 9: 38 (Feb.) 1960.)*

CARBON DIOXIDE Adjustments of body stores of carbon dioxide were studied during voluntary hyperventilation for one hour at a constant rate by trained subjects. Carbon dioxide was eliminated at an average of 161 ml. per mm. Hg decrease in mixed venous tension. Increasing the respiratory minute volume by about 50 per cent for one hour resulted in elimination of 1.5 to 2.5 liters of carbon dioxide in excess of the metabolic production. *(Vance, J. W., and Fowler, W. S.: Adjustment of Stores of Carbon Dioxide during Voluntary Hyperventilation, Dis. Chest. 37: 304 (March) 1960.)*

HYPERCAPNIA Progesterone is capable of lowering the arterial P_{CO_2} in patients with emphysema and hypercapnia. This hormone will aslo lower the alveolar P_{CO_2} in normal subjects. If one assumes that the action of progesterone causes a small but definite degree of hyperventilation, then it is of interest that this increase in ventilation is sufficient to cause a fall in arterial P_{CO_2} in patients with severe obstructive diseases and hypercapnia. Voluntary hyperventilation is incapable of lowering the arterial P_{CO_2} in patients with emphysema. The effect of progesterone on ventilation is not solely the effect of progestational activity. The ethinyl group inactivates the respiratory effects seen with progesterone itself and alterations of the molecular structure at other sites can abolish the effect. Conclusions on the mode of action of progesterone are not possible from this study. It lowers the arterial P_{CO_2} without altering the ventilatory response to carbon dioxide. Other areas of the brain, possibly the hypothalamus, may represents the site of action. *(Tyler, J. M.: The Effect of Progesterone on the Respiration of Patients with Emphysema and Hypercapnia, J. Clin. Invest. 39: 34 (Jan.) 1960.)*

HYPERCAPNIC ACIDOSIS Experiments were designed to investigate the effects of tris-hydroxymethyl-amino methane (T.H.A.M.) on hypercapnic acidosis in dogs. High degrees of hypercapnic acidosis were induced in the animals using the technique of earlier diffusion respiration experiments. Treated dogs were administered .34 mM. of T.H.A.M./kg./min. during a 60-minute period of apneic oxygenation. In the untreated dog, the *p*H decreased from 7.41 to 6.45; arterial P_{CO_2} increased from 38 to 346 mm. Hg; arterial oxygen saturation dropped from 100 to 54 per cent; total catecholamines increased from 1 to 44 micrograms per liter. In the dogs

treated with T.H.A.M., *p*H was not changed, arterial P_{CO_2} increased from 37 to 88, arterial oxygen saturation remained 100 per cent and plasma catecholamine levels remained unchanged. Although anuria occurred early in untreated dogs, profuse diuresis occurred in the animals treated with T.H.A.M. The urine contained between 50 and 60 mEq. of carbon dioxide and the total carbon dioxide recovered in the urine during the one hour of apnea amounted to 25 per cent of the carbon dioxide produced by the animal. Most of the carbon dioxide excreted by the kidney was in the form of a bicarbonate-amine. The experiments made it apparent that the vicarious elimination of carbon dioxide by the kidney under conditions of acute hypercapnic acidosis buffered with T.H.A.M. is sufficient in magnitude to be of real therapeutic value. *(Nahas, G., and Jordan, E.: Neutralization of the Acute Effects of Hypercapnic Acidosis by T.H.A.M., Aerospace Medicine 31: 61 (Jan.) 1960.)*

SWEATING Clinical symptoms of carbon dioxide retention were studied during diffusion respiration in 163 completely apneic patients. Premedication consisted of meperidine and atropine; barbiturate-succinylcholine anesthesia was used. After 10 minutes of apnea when *p*H of the blood was about 7.1 and oxygen tension was normal, 25 per cent of the patients showed sweating. It is concluded that sweating in an anesthetized patient is not a dependable sign of respiratory acidosis. *(Barth, L.: Sweating During Carbon Dioxide Accumulation Under Anesthesia, Der Anaesthesist 9: 65 (Feb.) 1960.)*

PULMONARY COMPLIANCE Convalescent poliomyelitic patients and normal subjects show a decrease in pulmonary compliance of 26 to 40 per cent as measured in the tidal volume range during quiet breathing after a series of deep breaths. This change occurs in the prone, supine, lateral and sitting positions. Two or more deep breaths to the limit of inspiration, after the period of quiet breathing, produce an increase in compliance. This increase can be eliminated by forced expirations in the normal subjects. It is thought that these changes are probably due to the opening and closing of various units within the lung. *(Ferris, E. G., and Pollard, D. S.: The Effect of Deep and Quiet Breathing on Pulmonary Compliance in Man, J. Clin. Invest. 39: 143 (Jan.) 1960.)*

VENTILATION In the presence of normal myoneural transmission, the integrated diaphragmatic electromyogram is a direct expression of the inspiratory activity of the respiratory center. Disappearance and recovery of electrical activity of the diaphragm, produced by controlled increases and decreases of ventilation in 11 anesthetized patients, were correlated with end-tidal alveolar carbon dioxide tensions. The onset of apnea occurred at an average P_{CO_2} of 38 mm. Hg. Recovery from apnea occurred at an average P_{CO_2} of 43 mm. Hg. The discrepancy probably results from the slow equilibration of carbon dioxide between the blood and nerve cells of the respiratory center. *(Fink, B. R., and others: Monitoring of Ventilation by Integrated Diaphragmatic Electromyogram, J.A.M.A. 172: 1367 (March 26) 1960.)*

VENTILATORY CAPACITY An apparatus is described which consists of a rotating vane whose rotation against the restraint of a spring varies the orifice available for escape of gases blown against it. The instrument is called a Peak Flow meter and is used to record Peak Flow Rates (PFR). PFR is the highest expiratory flow that can be sustained by maximal effort for at least 10 msec. PFR seems to be a stable and useful measure of ventilatory capacity. Normal PFR values range from above 100 L./min. in four year olds to over 900 L./min. for healthy men. *(Wright, B. M., and McKerrow, C. B.: Maximum Forced Expiratory Rate as a Measure of Ventilatory Capacity, Brit. Med. J. 2: 1041 (Nov. 21) 1959.)*

PULMONARY FUNCTION Regional variations of pulmonary ventilation and blood-flow have been studied in 30 patients by means of a radioactive isotope of oxygen (oxygen-15). This substance has a half life of two minutes. Pairs of scintillation counters are placed on the chest wall to measure radiation from two regions simultaneously. By observation of counting-rates during breath-holding following