an open thorax, the lower lung receives the greater pulmonary blood flow while the exposed lung is preferentially ventilated if allowed to expand freely; (2) although maldistribution would tend to raise P_{CO_2}, the use of an endotracheal tube and the depression of carbon dioxide output (because of the reduction in metabolic activity) have the opposite effect. Therefore, a normal arterial P_{CO_2} can be maintained by a minute volume of ventilation close to the normal for the conscious resting subject. (*Nunn, J. F.: Distribution of Inspired Gas During Thoracic Surgery, Ann. Roy. Coll. Surg. Engl. 28: 223 (Apr.) 1961.*)

LUNG VOLUMES Changing from sitting to either the supine or prone position caused a decrease in the expiratory reserve volume and the functional residual capacity in human volunteers. The decrease in both subdivisions of lung volume was less in the prone position than in the supine position. The diaphragm is probably at a lower level in the prone position. Total lung capacity decreased in both the supine and prone positions. (*Moreno, F., and Lyons, H. A.: Effect of Body Posture on Lung Volumes, J. Appl. Physiol. 16: 27 (Jan.) 1961.*)

LUNG MECHANICS Surface tension phenomena appear to account for a large part of the retractive force of excised lungs. However, conclusions drawn from observations of the activity of antifoaming agents in pulmonary edema do not support this view. Pulmonary vascular distension influences lung retraction. Tissue stability is due to low compressibility of the surface, which allows the largest possible number of air spaces to remain open, and to the high elastic modulus of collagen, which helps to insure equal expansion of air spaces. During breathing, flow resistance of the gas and tissues produces an additional volume pressure hysteresis which plays only a small role in the combined static and dynamic volume pressure hysteresis of lungs. Dynamic compliance, the ratio of the tidal volume to the change in pressure between points of zero flow at the extremes of the tidal volume, is independent of a wide range of breathing frequencies in normal lungs, but decreases with increasing breathing frequency with bronchoconstriction. Although conductance increases with increase in lung size, the relationship is complex. (*Mead, J.: Mechanical Properties of Lungs, Physiol. Rev. 41: 281 (Apr.) 1961.*)

MECHANICAL VENTILATION Twenty-three patients with diffuse chronic lung disease with life-threatening respiratory failure were treated by tracheotomy and mechanical ventilation. The respiratory crisis was produced by pneumonia, influenza, acute bronchitis, overdose of morphine, abdominal surgery, acute pancreatitis, or diabetic precoma in the patients who already had chronic bronchitis or chronic ventilatory disability due to pulmonary fibrosis after tuberculosis. Three patients had kyphoscoliosis. Tracheotomy was performed on all patients, a rubber-cuffed tube was inserted into the trachea and mechanical ventilation with 6 to 10 liters per minute of a high-oxygen mixture using a Lundia intermittent positive/negative pressure respirator was instituted. Usually the arterial oxygen saturation became normal and the patients regained consciousness after a few hours. Fifteen patients survived the crisis and 8 died. Of those who survived, the mechanical ventilation lasted an average of 13 days. Of those that died, ventilation was continued an average of 44 days. (*Munck, O., Kristensen, H. S., and Lassen, H. C. A.: Mechanical Ventilation for Acute Respiratory Failure in Diffuse Chronic Lung Disease, Lancet 1: 66 (Jan. 14) 1961.*)

COMPLIANCE The total respiratory compliance of anesthetized, relaxed adults is lower than that in awake subjects. This is probably due to the inability of conscious individuals to relax completely. Pulmonary compliance of resting newborn infants is low when compared on a lung weight basis to those recorded in the adult. Measurements of total lung and chest wall compliance at various airway pressures in 21 normal infants paralyzed with succinylcholine show that the average total compliance for a given airway pressure is greater when immediately preceded by an inflation at a higher airway pressure than by one at a lower airway pressure. A similarity between values for pulmonary and total com-

pliance in the infant is noted. This is probably because the infant's thorax has little influence on pulmonary expansion because of its characteristic anatomical structure; *i.e.*, horizontally placed ribs and cylindrical shape. Decrease in total compliance may be measured many hours prior to onset of clinical signs of respiratory disease. (*Richards, C. C., and Bachman, L.: Lung and Chest Wall Compliance of Apneic Paralyzed Infants, J. Clin. Invest. 40: 273 (Feb.) 1961.*)

AIRWAY RESISTANCE The extrathoracic airway includes the trachea, larynx, pharynx and nose. During mouth breathing this portion of the airway accounted for 45 per cent of the total airway resistance in normal subjects and 20 per cent in emphysematous subjects. Large inter- and intra-subject variations were observed. Extrathoracic airway resistance decreased as inflation of the lung increased. The major component of upper airway resistance is located in the larynx. (*Hyatt, R. E., and Wilcox, R. E.: Extrathoracic Airway Resistance in Man, J. Appl. Physiol. 16: 326 (Mar.) 1961.*)

RESPIRATOR A transistor electronically controlled respirator is triggered by the electrical activity of respiratory muscles, thus permitting the patient's own respiratory center to regulate breathing. The device has an automatic cycler and an alarm monitor system. Complete wiring diagrams are illustrated and the estimated cost of the parts is $100.00. (*Bennett, H. D., and Boren, H. G.: A Transistor Electronically Controlled Respirator, Dis. Chest 39: 382 (Apr.) 1961.*)

CARBON DIOXIDE The effect of respiratory hypercapnia and hypocapnia on the accumulation and entry of several organic electrolytes in a selected group of brain structures has been investigated. Twenty-five adult cats were used in the experiments. Upon exposure to 25 per cent carbon dioxide, the concentrations of phenobarbital, salicylic acid, and urea were increased in all anatomical regions of the cat brain. Conversely, brain levels of all of these substances were reduced by hyperventilation. High concentrations of carbon dioxide produced a greater relative increase in the entry and accumulation of salicylic acid and phenobarbital in predominantly myelinated areas than in gray matter. Hyperventilation produced the opposite effects. (*Goldberg, M. A., Barlow, C. F., and Roth, L. J.: Effects of Carbon Dioxide on Entry and Accumulation of Drugs in Central Nervous System, J. Pharmacol. Exp. Ther. 131: 308 (Jan.) 1961.*)

CONTROL OF RESPIRATION Conscious volunteers did not exhibit apnea at the conclusion of a period of active or passive hyperventilation to an end-expiratory carbon dioxide tension below 25 mm. of mercury. Anesthetized patients become apneic when hyperventilation lowers the end-expiratory carbon dioxide tension below 38–43 mm. of mercury, the so-called "apneic threshold." Cerebral activity associated with wakefulness probably plays an important part in the maintenance of the resting respiratory rhythm. Anesthetics probably do not alter the sensitivity of the respiratory center to carbon dioxide but merely depress the cerebral signal on which carbon dioxide operates. (*Fink, B. R.: Influence of Cerebral Activity in Wakefulness on Regulation of Breathing, J. Appl. Physiol. 16: 15 (Jan.) 1961.*)

PULMONARY RADIATION Radiotherapy directed to the thoracic region causes radiation injury to the lung. Radiologically, pathologically and clinically changes may be described as an early radiation pneumonitis progressing to late radiation fibrosis. All subdivisions of lung volume are irreversibly diminished. Pulmonary compliance is decreased and airway resistance is slightly increased. Unchanged alveolar ventilation and increased dead space ventilation are manifested by an increased minute volume of ventilation. Maximum breathing capacity and diffusing capacity of the lung are decreased. Transient hypoxemia occurred in all patients but usually reverted toward normal values as the syndrome progressed. There was no evidence of carbon dioxide retention or uneven distribution of inspired gas. (*Emirgil, C., and Heineman, H. O.: Effects of Irradiation of Chest on Pulmonary Function in Man, J. Appl. Physiol. 16: 331 (Mar.) 1961.*)