

total amount of carbon dioxide produced during apnea was excreted via the kidney. (Nahas, G. G.: *Use of Organic Carbon Dioxide Buffer in Vivo*, *Science* 129: 782 (March 20) 1959.)

**ION ADSORPTION** A simple calculation indicates that the layer in which potassium ion and sodium ion exchange takes place during nerve excitation is of mono-ionic thickness and that the process of the exchange is not a diffusion process. The emergence of the effective ionic radii of potassium ions and sodium ions from other calculations implies that electrostatic forces may be at work, and that the excitation phenomena may involve an adsorption phenomenon. (Aschheim, E.: *Ion Adsorption and Excitation*, *Science* 129: 779 (March 20) 1959.)

**ACID-BASE BALANCE** Alkalosis was found in 38 and acidosis in only 6 of a series of 62 studies made on 59 selected surgical patients in whom the acid-base balance of the extracellular fluid was studied with the aid of pH whole blood buffer base, the partial pressure of carbon dioxide, the serum bicarbonate and the oxygen saturation of the arterial blood. Thirty-six of the 38 instances of alkalosis were attributed to disease states. Twenty-four cases of the 36 showed oxygen unsaturation with diminished carbon dioxide tension. It is believed the respiratory system may be a factor of greater importance as a cause of alkalosis in surgical patients than has been previously thought. (Crandell, W. B., and Stueck, G. H., Jr.: *Acid-Base Balance in Surgical Patients: I. Survey of 62 Selected Cases*, *Ann. Surg.* 149: 342 (March) 1959.)

**INTRACELLULAR CONDUCTION** Striated muscle cells contract quickly and across the entire 100 micron diameter of the cell. Smooth muscle cells averaging 6 to 10 microns in diameter contract slowly and at relatively long times after the cell membrane action potential has passed. Such differences of time-distance relationships in muscle cells appears paradoxical and a hypothesis of intracellular impulse conduction has been formulated on the basis of studies of the structure and architecture of striated muscle. Diffusion

of substances from cell membrane to the central axis of the cell would be too slow to account for the rapid sequence of events in striated muscle contraction. Electron microscopic studies reveal a membrane limited reticulum structure of sarcoplasm associated with the cell membrane on one hand and the myofibrils on the other; such a system could transmit an excitatory impulse intracellularly and if diffusion mechanisms are in fact necessary to complete muscle contraction the short intracellular membrane distances which substances would have to traverse would be in keeping with the time-distance relationships of diffusion rate and speed of muscle contraction. This hypothesis is now under further experimental test. (Peachey, L. D., and Porter, K. R.: *Intracellular Impulse Conduction in Muscle Cells*, *Science* 129: 721 (March 13) 1959.)

**TRACHEOBRONCHIAL BACTERIA** Bronchial mucus from 200 patients was studied. One hundred specimens were obtained at bronchoscopy, and 100 were obtained at surgery from the proximal bronchial opening. All cultures taken during bronchoscopy were positive and contained mixed cultures of bacteria found in the pharynx. Cultures of the bronchial swabs showed no growth in 80 cases, and the other 20 per cent contained bacteria usually in pure culture. The high incidence of positive cultures from the first group is probably due to aspiration of saliva into the normally sterile tracheobronchial tree. (Correll, N. O., and others: *Bacterial Flora of Human Tracheobronchial Tree*, *J. Thoracic Surg.* 37: 367 (March) 1959.)

**AIRWAY RESISTANCE** A multiple-interrupted valve was used to measure airway resistance at controlled flow rates. Airway resistance is relatively constant over the middle third of both inspiration and expiration, resistive pressure being proportional to the 1.6 power of flow over the range 30 to 60 liters/minute. During the final third of inspiration and expiration, resistive pressure rose. (Shephard, R. J.: *Timed Airway Resistance*, *J. Physiol.* 145: 459 (March) 1959.)

**ASSISTED RESPIRATION** Assistance to respiration is provided with a pneumatic