

Respiratory Insufficiency, Amer. J. of Med.
28: 368 (March) 1960.)

ALTITUDE The exposure of dogs to a simulated altitude of 30,000 feet for 30 minutes resulted in marked respiratory alkalosis and hypokalemia. Blood pH rose from an initial level of 7.46 to 7.71 after three and one-half minutes of exposure to altitude. While the potassium levels were decreasing, glucose levels were increasing simultaneously during exposure to altitude. (Gold, A. J., Barry, J. Q., and Ferguson, F. P.: *Early Effect of Moderate Altitude Stress on Plasma Potassium in the Dog, J. Appl. Physiol.* 15: 37 (Jan.) 1960.)

DRUG EVALUATION A system was devised combining means of 1) automatic sampling of end-tidal gas; 2) rapid analysis of samples of gas for carbon dioxide concentration; and 3) manual or automatic modification of percent carbon dioxide in succeeding inspirations to permit maintenance of alveolar P_{CO_2} at desired levels above the carbon dioxide tension natural for a particular experimental situation. By imposing a fixed, elevated alveolar P_{CO_2} upon a subject, effects of drugs or physiological stresses upon carbon dioxide-sensitive functions can be evaluated, unmasked by the compensatory alterations of alveolar and arterial P_{CO_2} which normally result from changes in alveolar ventilation or metabolism. This method was first used in the study of meperidine—on the rate of onset, time of peak effect, and rate of disappearance of its action on respiration. (Lambertsen, C. J., and Wendel, H.: *An Alveolar P_{CO_2} Control System: Its Use to Magnify Respiratory Depression by Meperidine, J. Appl. Physiol.* 15: 43 (Jan.) 1960.)

THERMO HOMEOSTASIS Human experiments were done to test the thermal homeostasis of the alveolar-capillary structures. The human alveolar temperature was virtually constant even though under the most extreme thermal conditions. The entire heat exchange and vaporization does not take place in the alveoli. (Rubenstein, E., Pardee, R. C., and Eldridge, F.: *Alveolar-Capillary Temperature, J. Appl. Physiol.* 15: 10 (Jan.) 1960.)

HYPOTHERMIA In induced hypothermia the following changes have been observed: a reduction in the amount of circulating hemoglobin, a decrease in the number of platelets and white blood cells, and a decrease in the plasma concentration of fibrinogen. These changes seem to be correlated with the occurrence of intravascular aggregation of red blood cells which is promoted by an increase in concentration of plasma proteins and an increased concentration of erythrocytes. This intravascular aggregation by hypothermia, which produces an impaired nutritive blood flow in animals and may cause myocardial hypoxia, may be prevented by infusions of low molecular weight (25,000 to 40,000) dextran. (Lofstrom, B.: *Induced Hypothermia and Intravascular Aggregation, Acta Anesthesiologica Scandinavica Supplement III*, 1959.)

HYPOTHERMIA Standardized brain injuries were produced in dogs by the application of liquid nitrogen to the surgically exposed dura mater and subjacent brain. Hypothermia (25 C.) induced within three hours after such injury would protect against mortality. If temperature were not reduced or not reduced sufficiently early after injury death would result. No relationship between the degree of cerebral edema observed and mortality could be determined. (Rosomoff, H. L., and others: *Experimental Brain Injury and Delayed Hypothermia, Surg. Gynec. & Obst.* 110: 27 (Jan.) 1960.)

SELECTIVE HYPOTHERMIA Selective local hypothermia of the heart (pouring saline at 0 to 5 C. into the pericardial sac) permits at least one hour of cardiac anoxia in the dog during cardiopulmonary bypass with the remainder of the blood at normal body temperature. This technique avoids the disadvantages of potassium arrest or coronary infusion with cold blood, yet it provides a dry, quiet heart for prolonged periods. The technic has been used in 13 dogs with death occurring in only one. (Shumway, N. E., Lower, R. R., and Stofer, R. C.: *Selective Hypothermia of the Heart in Anoxic Cardiac Arrest, Surg. Gynec. & Obst.* 109: 750 (Dec.) 1959.)