

**CARDIAC PACEMAKING** Cardiac pacemaking can raise cardiac output associated with a fixed slow rate and improve splanchnic, renal and coronary blood flow. In 56 patients an implanted coil located subcutaneously which is inductively coupled to a coil overlying the skin has been used. This arrangement has the advantage of allowing rate and applied power to be varied and requiring minimal implanted material. (Taylor, A. B.: *Experience with Cardiac Pacemaking, Brit. Med. J.* 2: 543 (Sept.) 1966.)

**CARDIAC OUTPUT** The effect of changes in arterial pH and  $P_{CO_2}$  on cardiac output during halothane anesthesia was studied in normothermic dogs. Anesthesia was induced and maintained with halothane while cardiac output was measured either by dye dilution techniques or by means of a chronically implanted electromagnetic square wave flowmeter. The  $P_{CO_2}$  was maintained steady by means of a volume limited respirator while the animal was paralyzed with succinylcholine. Changes in arterial pH were produced by subjecting the animals to periodic bursts of hypoxia and then allowing the arterial  $P_{CO_2}$  to return to normal. After each reduction in pH the cardiac output was measured. Changes in  $P_{CO_2}$  were produced by adding carbon dioxide to the inspired mixture. Cardiac output was depressed linearly by linear falls in pH and increased parabolically by changes in arterial  $P_{CO_2}$  after allowing for those changes due to pH alterations. (Tomlin, P. J.: *Quantitative Effects of Changes in Arterial pH and  $P_{CO_2}$  upon Cardiac Output during Halothane Anesthesia in Dogs, J. Physiol.* 185: 66P (July) 1966.)

**DIGITALIS** The effects of ouabain upon the contractile properties of the intact, nonfailing human heart were studied by measuring myocardial force-velocity relations prior to and after 0.01 mg./kg. of the glycoside. Ouabain always augmented contractility but no consistent change in cardiac output were observed. Cardiac output is controlled by many factors of which contractility is only one. Therefore in the absence of heart failure, an increase in contractility produced by a cardiac glycoside, may not increase cardiac out-

put. However, when cardiac output is decreased as a result of decreased contractility (heart failure), digitalis will elevate output. The finding that glycosides fail to elevate cardiac output in normal subjects does not preclude a positive inotropic action. (Sonnensblick, E. H., and others: *Studies on Digitalis, Circulation* 34: 532 (Sept.) 1966.)

**PULMONARY CIRCULATION** A method for the measurement of the ratio of alveolar ventilation to perfusion in individual lung zones during normal steady state conditions is described in four subjects.  $^{133}\text{Xenon}$  is used as the tracer gas. Regional count rates were recorded during a 5-minute period of constant intravenous infusion of this substance dissolved in saline and during a similar period of rebreathing into a closed circuit. For practical purposes a steady state is achieved within these time limits in normal subjects. Similar patterns of regional ventilation to perfusion ratios were recorded during quiet tidal breathing in the subjects seated upright. It was possible to correct these data to allow for the influence of re-inspired dead space gas and to compute regional ventilation to perfusion ratios where ventilation represented total gas-exchange ventilation. Regional respiratory gas concentrations were calculated from such ventilation perfusion measurements and appeared to show less regional variation than previously reported. Infusion of  $^{133}\text{Xenon}$  delivers a higher dose of radiation than do multiple single injections. This would probably prohibit repetitive infusion experiments in normal subjects for solely experimental purposes. (Anthonisen, N. R., Dolovich, M. B., and Bates, D. V.: *Steady State Measurement of Regional Ventilation to Perfusion Ratios in Normal Man, J. Clin. Invest.* 45: 1349 (Aug.) 1966.)

**CEREBRAL CIRCULATION** The relation between cerebral blood flow and blood  $\text{CO}_2$  tension after rapid alterations in inspired  $\text{CO}_2$  were studied in 13 normal male volunteers. With progressive stepwise increases and decreases in arterial  $\text{CO}_2$  tension above the control level, jugular venous  $\text{CO}_2$  tension correlated more exactly with cerebral blood flow