

almost to the value obtained with the subject at rest in the supine position. Moderate exercise in the upright position results in a stroke index similar to that obtained when the subject was at rest in the supine position. With severe exercise it increases to 59 ml. Apparent discrepancies in previous reports are probably due to variations in the circumstances under which resting values were obtained. (Wang, Y., Marshall, R. J., and Shepherd, J. T.: *Effect of Changes in Posture and of Graded Exercise on Stroke Volume in Man, J. Clin. Invest.* 39: 1051 (July) 1960.)

CARDIAC FIBRILLATION The essential factor for fibrillation in the experimental animal is a shortening of the refractory period, usually indicated by a shortening of the action potential. The long refractory period of cardiac as compared to skeletal muscle normally protects the cardiac muscle from fibrillation. Energy is required to maintain its length and fibrillation is facilitated when there is lack of glucose or oxygen or in the presence of metabolic inhibitors. Rising concentrations of calcium ions and falling concentrations of potassium ions also tend to favor reduction of the refractory period and fibrillation. It also seems necessary for the fibers to be out of phase. Such a condition exists when a stream of impulses is produced by electrical stimulation or an ectopic focus and it is likely that the rapid stimulation depresses conduction velocity unequally, thus tending to throw adjacent fibers out of phase. A single impulse in the relative refractory period may act in the same way to slow conduction, arriving at a time when fibers are out of phase because inequality of recovery exists among them. (Burn, J. H.: *Cause of Fibrillation, Brit. Med. J.* 1: 1381 (May 7) 1960.)

BARORECEPTORS Baroreceptor endings may be demonstrated in the pulmonary artery of the anesthetized dog. All of the receptors so located are in the vicinity of the main bifurcation of the pulmonary artery or in the right and left branches between the main bifurcation and the origins of the lobar branches. No receptors have been located in the pulmonary trunk proximal to the main bifurcation. Recordings from fibers whose endings are lo-

cated in the pulmonary artery show a ventricular systolic pattern of discharge similar to that from aortic baroreceptor fibers. Other fibers show additional patterns of discharge. (Colebridge, J. C. G., and Kidd, D.: *Electrophysiological Evidence of Baroreceptors in Pulmonary Artery of Dog, J. Physiol.* 150: 319 (Feb.) 1960.)

BLOOD VOLUME Studies in rabbits and dogs have suggested that plasma disappears from the circulating blood after a blood transfusion. Occasionally more plasma disappears than is infused. In an attempt to study the phenomenon in man, 24 patients, whose average age was 58 years, were studied after having received 2 to 4 transfusions of 450 ml. whole blood. The blood transfusions amounted to 14 to 75 per cent (average 36 per cent) of the original blood volume. The changes produced included (a) an increase in cell volume of approximately the quantity of cells administered; (b) a reduction of plasma volume; (c) a slight increase in total blood volume (averaging 9 per cent of the original blood volume). The regulation of blood volume after transfusions appears to be explained by an increase in hydrostatic pressure in the veins associated with increased capillary permeability which leads to a loss of plasma and protein from the circulating blood. (Andersen, S. B.: *Blood-Volume in Elderly Anaemic Patients Following Blood-Transfusions, Lancet* 1: 717 (April 2) 1960.)

BLOOD PRESSURE Stimulation of the upper thoracic sympathetic trunk in man during surgical procedures resulted in an increase in systolic pressure, no change in diastolic pressure and an increased pulse pressure. There was also cardiac acceleration although it was not as constant as the blood pressure changes. The changes noted are probably explained by an increase in force of myocardial contraction. (Randall, W. C., and McNally, H.: *Augmentor Action of Sympathetic Cardiac Nerves in Man, J. Appl. Physiol.* 15: 629 (July) 1960.)

BLOOD CLOTTING MECHANISM The clotting mechanism of blood carefully drawn through siliconized equipment into a non-

vacuum siliconized ACD solution bottle, and stored at 4 C., remains essentially intact during a period of 48 hours. This is especially true of the platelets, which appear to be the critical element in the production of hemorrhagic diathesis during massive blood transfusion therapy. When an emergency need arises for massive transfusion therapy, it is recommended that one unit of blood drawn as described be utilized for every three units that have been stored more than 48 hours, or which have been drawn into vacuum nonsiliconized containers. When such a technique is followed, hemorrhagic diathesis generally will be avoided. (*Senhauser, D. A.: Preservation of the Coagulation System in Stored Whole Blood, Cleveland Clin. Quart. 27: 125 (July) 1960.*)

CARDIAC MONITOR While being prepared for a lung operation, a patient died when he received a 325-volt shock from a cardiac monitor. One electrode had been attached to the patient's thumb, one to his head, and a third diathermy plate-electrode to his right leg. This third electrode was connected to the case of the instrument which was assumed to be grounded. When the instrument was switched on, the patient moved but, as this often happens, no particular notice was taken. However, when the anesthetist received a shock of "some magnitude" when he touched the patient, something was obviously wrong. When the monitor was examined, it was found not to be grounded. Apparently the grounding connection to the case had been omitted in error. This was a commercially available product and not a "home-made" instrument. (*Medicine and The Law: Fatal Shock from Cardiac Monitor, Lancet 1: 872 (April 16) 1960.*)

PULMONARY CIRCULATION Long periods of extracorporeal circulation produce a decrease in the diffusion capacity of the lungs. This may be caused by lack of lung perfusion during bypass, capillary occlusion by blood particles or the general effect of blood trauma. These effects can be reduced by using the autogenous lung as an oxygenator. When bypass techniques are combined with cooling to 20 C, the flow can be small and

periodically arrested. In this latter situation blood trauma is reduced. (*Aletras, H., and others: Pressure Conditions in Pulmonary Circulation During Cardiac By-Pass by Double Pumps, J. Thor. & Cardiovasc. Surg. 40: 33 (July) 1960.*)

HYPOTENSIVE DRUGS Usually the most satisfactory treatment of hypertension results from treatment with 2 or more hypotensive agents, sometimes with the added potentiating effect of chlorothiazide. The veratrum alkaloids act by eliciting the Bezold reflex whose receptors are in the myocardium and whose afferent fibers are in the vagus. The effects include hypotension, bradycardia and some peripheral vasodilatation. Postural hypotension does not occur. Hydrallazine acts mainly on brain stem centers, but it also has some sympatholytic effect as well as some direct action on the peripheral vessels. The diastolic pressure falls, tachycardia occurs and the cardiac output rises. Visceral, including renal, flow rises as does flow to the extremities. Angina may occur. Reserpine produces some fall in blood pressure due to its tranquillizing effect, but the main action is central, probably on the hypothalamus. It is capable of depleting tissues of serotonin and norepinephrine and this may be related to its hypotensive action. Bradycardia also occurs. It potentiates the effects of other hypotensive agents especially ganglionic blocking agents. Adrenergic blocking agents such as phenoxybenzamine and phentolamine block the effects of stimulation of sympathetic nerves as well as the effects of circulating epinephrine and norepinephrine. Bretylium blocks the effects of sympathetic stimulation without blocking the effect of circulating catechol amines, in fact enhancing them. These agents produce postural hypotension. The ganglionic blocking agents consist of quaternary ammonium compounds and secondary and tertiary amines. Examples of the former are tetraethyl ammonium, pentamethonium, hexamethonium, pentolinium and chlorisondamine. These drugs block all autonomic ganglia and all produce postural hypotension. Their effect is enhanced by vasodilatation and hypovolemia. Mecamylamine, a secondary amine, and pempidine, a tertiary amine, act in a similar manner, but their dura-