to valvulotomy when the left lung was partially collapsed. After re-expansion of the left lung during closure, half of the patients had arterial P_{O_2} values below 100 mm. mercury when 50 per cent oxygen was used in the inspired mixture. Ventilation by *p*H and P_{CO_2} criteria was normal throughout. (*Hallowell, P., and others: Oxygenation During Closed Mitral Valvulotomy, J. Thor. Cardiov. Surg. 50: 42 (July) 1965.*)

POSTOPERATIVE HYPOXIA Pulmonary causes are: alveolar hypoventilation, uneven air/blood distribution, impaired diffusion, and venous-arterial shunting. These result in cardiac disturbances because cardiac output, respiratory work, and pulmonary vascular resistance are all increased. Circulatory tests were run while patients breathed 10 per cent and 100 per cent oxygen. During acute hypoxia (75 per cent arterial oxygen saturation), cardiac output should rise 25 per cent. If cardiac output declines instead, the cardiac reserve is poor and the hazards of intrathoracic surgery are prohibitive. (*Birkeland, S.: Circulatory Changes During 100 Per Cent Oxygen Respiration and Acute Hypoxia for Preoperative Evaluation in Thoracic Patients, Acta Chir. Scand. 128: 746 (Dec.) 1964.*)

OBSTRUCTIVE LUNG DISEASE In 175 cases of chronic obstructive lung disease in ambulant outpatients, expiratory slowing, which correlated best with clinical observations, was in turn best correlated with vital capacity, the ratio of residual volume to total lung capacity, partial pressure of carbon dioxide and arterial oxygen saturation. (*Burrows, B., and others: Chronic Obstructive Lung Disease, III. Inter-relationships of Pulmonary Function Data, Amer. Rev. Resp. Dis. 91: 861 (June) 1965.*)

PULMONARY EMPHYSEMA In 175 cases of chronic obstructive lung disease the one-second forced expiratory volume calculated as a percentage of the predicted vital capacity correlated more closely with severity of dyspnea and clinical assessment of severity of disease than any other parameter. Fluoroscopic assessment of residual volume, diaphragmatic immobility and pulmonary artery prominence correlated better with the above parameters than with other pulmonary function measurements. (*Burrows, B., and others: Chronic Obstructive Lung Disease. II. Relationship of Clinical and Physiologic Findings to the Severity of Airways Obstruction, Amer. Rev. Resp. Dis. 91: 665 (May) 1965.*)

CARBOXYHEMOGLOBIN Carbon monoxide content of blood of normal non-smokers was 0.01 to 0.36 per cent by volume; average saturation, 0.9 per cent. In smokers the content was 0.15 to 2.39 per cent and average saturation was 4.2 per cent. Oxygen tensions of blood were measured before and after inhalation of 0.4 per cent CO in air—a sufficient concentration to raise the carboxyhemoglobin saturation to 5–10 per cent. The arterial and mixed venous oxygen tension decreased an average 7.3 and 13.3 per cent, respectively. The partial combination of hemoglobin with carbon monoxide makes the remaining hemoglobin bind oxygen with abnormal tenacity. A 5 to 10 per cent saturation of carboxyhemoglobin could lead to severe myocardial hypoxia in patients with coronary artery disease. (*Ayres, S. M., Giannelli, S., Jr., and Armstrong, R. G.: Carboxyhemoglobin: Hemodynamic and Respiratory Responses to Small Concentrations, Science 149: 193 (July 9) 1965.*)

CARDIAC RESUSCITATION Despite the effectiveness of the standard resuscitative procedures in cardiac arrest, there remains a number of patients whose hearts cannot be restarted despite the fact that their neurological and physiological status is compatible with survival. The refractory nature of these cases is presumably due to the fact that cardiac massage does not produce sufficient arterial blood pressure and coronary circulation to permit recovery of myocardial function. The sustained use of extracorporeal circulation to increase coronary perfusion offers a means of resuscitating these patients. In a series of five patients, an effective cardiac beat was restored in four following periods of cardiac bypass varying from 30 to 60 minutes. One surgeon performed effective cardiac massage while a second surgeon connected the patient to a pump oxygenator by means of arterial and

venous cannulae. With the availability of simple heart-lung machines, which may be primed with crystalloid solutions, it may be feasible to use extracorporeal circulation as an adjunct to cardiac resuscitation in a variety of clinical circumstances. (*Joseph, W. L., and Maloney, J. V.: Extracorporeal Circulation as an Adjunct to Resuscitation of the Heart, J.A.M.A. 193: 683 (Aug. 23) 1965.*)

RESUSCITATION Cessation of breathing movements and absence of pulse and heart sounds no longer can be considered signs of death. Death should be defined as evidence of irreversible cerebral destruction with unconsciousness. So, when a patient is found in acute respiratory or circulatory distress and he is not known to be in the terminal stages of an incurable disease, he should be considered salvable and treated promptly with a complete resuscitative effort. After the base line of cerebral oxygenation has been established, the situation should be assessed. Unnecessary prolongation of the act of dying should be avoided if the underlying disorder appears incompatible with survival or if there is clear-cut evidence that the hypoxic episode produced irreversible cerebral damage. (*Safar, P.: Cardiopulmonary Resuscitation Postgrad. Med. 38: 7 (July) 1965.*)

EXTERNAL CARDIAC RESUSCITATION External cardiac massage combined with artificial ventilation appears to be the method of choice for the management of cardiac arrest or ventricular fibrillation. Direct open cardiac massage would appear indicated where the chest is already open or where cardiac tamponade is suspected. It is well to bear in mind that the thoracic cage in a recently dead person is quite pliable, being completely relaxed and non-resistant. Fractures of the sternum produce instability of the chest, which may require tracheotomy and assisted ventilation. Too rigorous compression should likewise be avoided to prevent rupture of a dilated, diseased heart, or of the upper abdominal viscera. Intravenous or intracardiac administration of epinephrine hydrochloride (1 or 2 ml. of 1:1,000 or 1:10,000) is helpful for its cardiac stimulatory effect and also for its intense vasoconstrictive effects upon less vital circulatory areas. Once a spontaneous heart beat is restored, isoproterenol hydrochloride (1:50,000 intravenously in 0.5–2 ml. doses, depending on patient size) and sodium bicarbonate (2–4 mEq./kg., intravenously) or tromethamine are useful adjuncts. (*Lillehei, C. W., and others: Four Years' Experience With External Cardiac Resuscitation, J.A.M.A. 193: 651 (Aug. 23) 1965.*)

CARDIAC MASSAGE The overall results of cardiac resuscitation in 128 patients are summarized. This includes all patients for whom the cardiac resuscitation team was called because of sudden circulatory arrest manifest as loss of pulses and heart sounds and diagnosed by a physician. Instances of cardiac arrest occurring in the operating rooms have been excluded. Most of the patients were between 50 and 80 years of age, but survival was more common among those under 50. Of the 128 patients, 38, or 30 per cent, survived for more than 24 hours, and 23, or 18 per cent, were ultimately discharged from the hospital. Ventricular fibrillation was recorded in 44 of the patients and included 13 of those surviving. Asystole was diagnosed in 54 patients, and 7 of these survived. Metabolic acidosis and raised arterial-lactate levels were found in most patients. Correction of the acidosis with intravenous sodium bicarbonate was found beneficial. (*Smith, H. J., and Anthonisen, N. R.: Results of Cardiac Resuscitation in 254 Patients, Lancet 1: 1027 (May 15) 1965.*)

MASSAGE COMPLICATIONS Closed-chest cardiac massage is not without complications. Most of these are rib or sternal fractures, but bone marrow emboli, hemothorax, hemopericardium, pneumothorax, mediastinal emphysema, gastric rupture, and lacerations of spleen, liver, and blood vessels also occur. A case of aortic rupture secondary to sternal fracture emphasizes that extreme caution should be used to prevent overcompression of the sternum. There is a tendency to compress the sternum more than necessary during the emergency, and the risks are further compounded in the treatment of an elderly patient with a fixed chest. (*Nelson, D. A., and Ashley, P. F.: Rupture of the Aorta During*