served with an ACD-IAG solution. The latter consists of 1.34 g. inosin, 0.034 g. adenosin and 0.071 g. guanosin, added to 100 ml. ACD solution. Its activity serves to maintain the ATP content of the red cells, decrease the degree of spontaneous hemolysis and preserve intracellular potassium levels. Oxygen capacity and hemoglobin was significantly higher in IAG than in ACD stored blood during the first few days of storage while the reverse was observed after two weeks. The oxygen content was significantly higher in IAG than in ACD blood throughout the first three weeks of storage. Oxygen saturation was higher in ACD blood during the first three days, but significantly higher in IAG blood in the second and third weeks. The CO_2 tension in ACD blood was above the tension in IAG blood throughout storage time though both values rose by about 50 per cent within four weeks. Oxygen tension was significantly higher in IAG blood. The fall of *p*H in both IAG and ACD blood was parallel: a fall from 7.0 to 6.45 for ACD blood compared to a fall from 7.1 to 6.35 for IAG blood over a period of four weeks, *e.g.*, a somewhat steeper rise of acidity for IAG blood. The shift of the oxyhemoglobin dissociation curve in IAG blood was to the right and ACD blood to the left as compared with fresh blood. It was concluded that stabilization of blood conserved by IAG offers advantages over conservation with ACD in regard to metabolism and function of the red cells. (*Broghammer, H., and Fritzsche, W.: Blood Gas Analysis of Bank Blood Stored in Plastic Bags with Stabilization by ACD and IAG Solutions, Klin. Wschr. 44: 519 (May) 1966.*)

CLOTTING IN OUTDATED PLASMA Assays of several clotting factors were performed on outdated plastic bag, blood bank plasma 25 to 36 days old and after four months of storage of aliquots at 4° C. and −20° C. Findings suggest that outdated blood bank plasma screened for satisfactory AHG levels may be used directly for therapy or as a source of concentrated AHG fractions. It was estimated that approximately 10 per cent of the blood bank blood in the U. S. is discarded annually because of outdating. Utilization of 10 per cent of the plasma from this blood would provide perhaps as much as 50,000 units of plasma annually for replacement of clotting factors. (*Rosenthal, R. B., and Sloan, E.: Assay of Clotting Factors in Outdated Blood Bank Plasma and Its Potential Use for Therapy in Hemophilia and Other Hemorrhagic Dyscrasia, Transfusion 6: 289 (July) 1966.*)

PLASMAPHERESIS Levels of clotting factors compatible with normal hemostasis can be achieved in the plasma of patients with severe congenital deficiencies by transfusion of large amounts of fresh frozen plasma after prior reduction of the plasma volume of the patient by plasmapheresis. The increasing availability of antihemophilic factor concentrates may perhaps leave few indications for the plasmapheresis techniques described in this report, but it remains available for emergencies when no other adequate source of antihemophilic factor is available, and routine plasma transfusions are inadequate. (*Perkins, H. A.: Plasmapheresis of the Patient as a Method for Achieving Effective Levels of Plasma Coagulation Factors Using Fresh Frozen Plasma, Transfusion 6: 293 (July) 1966.*)

EXTRACORPOREAL CIRCULATION A conference on the use of blood and blood substitutes for extracorporeal circulation was held at the National Academy of Sciences, June 18, 1965. The purpose was to review the choice of perfusates to prime pump-oxygenators for cardiopulmonary bypass. The conclusions were as follows: (1) The need for blood banking and other medical resources to obtain blood for extracorporeal circulation reduces the amount of time which can be applied for the performance of other essential functions with general transfusion services. (2) Reports available offer no evidence that whole homologous ACD blood suitably modified with heparinized calcium chloride and properly buffered immediately before use could not provide good results in cardiac surgery if used within four days of collection. (3) The use of homologous whole blood especially in large amounts involved several difficulties: (a) hepatitis, (b) a syndrome during the third to sixth

postoperative week characterized by febrile illness associated with splenomegaly, and the appearance of abnormal lymphocytes in the peripheral blood, anorexia and weakness. (4) An increasing number of surgeons have used no homologous blood at all for priming pumps. They claim better perfusion of the microcirculation, a reduction of red cell sludging, less alteration of hemostasis, complete avoidance of the risk of post-transfusion hepatitis, the postperfusion lymphocytic syndrome, isoimmunization, and the homologous blood syndrome. As far as can be determined, hematocrit levels as low as 20 to 25 per cent are tolerated during extracorporeal circulation. The physiological stress of rapid hemodilution at the onset of the procedure appears to be minor. (5) There is no single simple answer to the question of the applicability of hemodilution and the modification of the priming fluid in all situations. Whether to use whole blood, hemodilution, or total substitution or whether to modify the perfusate in some particular respect must be decided by the individual surgeon and his consultant group. (6) Serious postoperative bleeding is no longer of great importance. Currently the estimated incidence is 1 per cent and except in incidences of severe protracted shock, most of the serious bleeding that does occur is the result of ineffective local hemostasis at the time of surgery. (7) When sufficient electrolyte solution is added to the pump to reduce the hematocrit to 25 per cent, fibrinogen, prothrombin and factor V concentrations are lower but there is less fibrinolysis than when whole blood is used as the perfusate. When dextran is used as the perfusate, the levels of fibrinogen and factor VIII are significantly lower. (8) The type of pump oxygenator seems to have relatively little effect on changes observed in the plasma coagulation factors. Use of the membrane oxygenator is associated with almost complete disappearance of platelets in the donor's blood before bypass but during bypass the platelet count in the blood in the circuit usually rises to normal. Reduction in the number of platelets is related to the volume of donor blood used, especially if it was collected more than twenty-four hours before use. (9) The patients who die during or after surgery usually have variable levels of factors V and VIII, prothrombin, fibrinogen, and platelets, suggesting that intravascular coagulation has occurred. This stresses the importance of maintaining high levels of heparin in the blood of patients with inadequate circulatory flow. (10) Most investigators still report plasma hemoglobin levels to be increased at the conclusion of extracorporeal circulation. These vary directly with the duration of the pump procedure. It is increased when 5 per cent dextrose and water is used as a diluent and decreased when Pluronic F68 is added. (*Committee on Blood and Transfusion Problems, Division of Medical Sciences, National Academy of Sciences-National Research Council: The Use of Blood and Blood Substitutes for Extracorporeal Circulation, Transfusion 6: 355 (July) 1966.*)

DEXTRAN Low molecular weight dextran has a high colloid osmotic pressure and increases plasma volume markedly by withdrawing water from the interstitial fluid compartment. The reduction in blood viscosity is associated with a marked increase in the microcirculation. This may prevent the formation of toxic substances from tissues which might otherwise be damaged by ischemia. Dextran appears to coat the erythrocyte surface and "crowd out" protein substances which tend to sludge blood. The increased intravascular volume caused by dextran may aid in maintaining the normal moderate tone of the small vessels, part of which is dependent on myogenic response to internal pressure. (*Schneiweiss, R., and others: Prevention of Hypotension Following Release of Aortic Occlusion, Surgery 60: 628 (Sept.) 1966.*)

DEXTRAN Low molecular weight dextran given to 3 subjects for from 4 to 12 days for treatment of vascular occlusions, without hypotension or dehydration, resulted in acute renal failure in all and in one fatality. On renal biopsy the renal tubules were found to be engorged with dextran. (*Morgan, T. O., and others: Renal Failure Associated with Low-molecular-weight Dextran Infusion, Brit. Med. J. 2: 737 (Sept.) 1966.*)