the bleeding time and platelet adhesiveness defect found in vWd. (SPR)

- 53 *The Role of Folate and Vitamin B₁₂ in the Etiology of the Thrombocytopenia of Iron Deficiency Anemia.* SANFORD LEIKIN and PARVANEH VOSSOUGH*, Children's Hosp. of the D.C., and George Washington Univ. Sch. of Med., Washington, D.C.

Thrombocytopenia is an unexplained complication of iron deficiency anemia. Studies have suggested that the low levels of platelets may in some instances be related to a folate or vitamin B₁₂ deficiency. In order to pursue this possibility, neutrophil lobe counts, bone marrow examinations, serum folate and vitamin B₁₂ levels, and formiminoglutamic acid (FIGLU) excretion studies were performed on 55 iron deficient anemic infants and children both with and without thrombocytopenia. Similar studies were performed on normal children. There was an increased incidence of hypersegmentation in the iron deficiency patients and a number of these children exhibited increased lobe averages. Twenty-five of the anemic children showed abnormalities of the bone marrow consistent with megaloblastic dysplasia. The serum vitamin B₁₂ levels were within normal limits in all patients but the serum folate level was decreased in two of them, and three children excreted increased amounts of FIGLU.

Although there appeared to be a slightly greater incidence of bone marrow megaloblastoid changes in the thrombocytopenic children no clear separation on a morphologic or biochemical basis could be made between those with and without a platelet deficiency. These findings indicate that although a folate or vitamin B₁₂ deficiency at the bone marrow level may be involved in the causation of the thrombocytopenia of iron deficiency anemia, other factors may also be important in the etiology of the complication. (SPR)

- 54 *Congenital Pernicious Anemia with Coexistent Transitory Intestinal Malabsorption of Vitamin B₁₂.* BEATRICE C. LAMPKIN* and ALVIN M. MAUER, Dept. of Pediat. Univ. of Cincinnati, Ohio.

Pernicious anemia (PA) with coexistent transitory intestinal malabsorption of vitamin B₁₂ has been documented in adults. This report is the first description of proven transitory selective intestinal malabsorption of vitamin B₁₂ in congenital PA. A vitamin B₁₂ responsive anemia was demonstrated in the patient, a 2 1/2-year-old girl, by change in the bone marrow from megaloblastic hyperplasia to normoblastic hyperplasia 48 h after 5 µg of vitamin B₁₂. No intrinsic factor (IF) was found in gastric fluid by in vitro assay before and again 4 and 6 weeks after therapy. Congenital PA was established by the age of the patient, absence of IF in gastric fluid, lack of antibodies to IF and parietal cells, presence of HCl in gastric fluid, and normal gastric biopsy. The xylose tolerance test, 72 h fecal fat determination, upper GI series, and biopsy of the jejunum were normal, but the Schilling test was abnormal with hog IF of known potency on two occasions, indicating selective malabsorption of vitamin B₁₂. Six months after therapy the Schilling test was still abnormal without IF, but was normal with both human and hog IF. This normal absorption with IF after therapy is indicative that selective malabsorption was originally present, probably as a consequence of the vitamin B₁₂ deficiency resulting from IF lack. In patients with abnormal radioactive vitamin B₁₂ absorption tests with administration of IF, coexistent PA must be excluded by demonstration of IF in gastric fluid. (SPR)

- 55 *Oxymetholone Therapy of Aplastic Anemia.* DONALD M. ALLEN*, MORRIS H. FINE*, THOMAS F. NECHELES* and WILLIAM DAMESHEK*, Tufts University School of Medicine, and N.E. Medical Center Hosps., Boston, Mass. (introduced by S.S. Gellis).

A new oral synthetic androgen, oxymetholone (2-hydroxymethylene-17 methyl-17B hydroxy-3-androstanone), has been remarkably effective in the treatment of 5 consecutive children with aplastic anemia, including 2 unresponsive to oral testosterone. The pattern of response was similar in each patient with diminished purpura and transfusion requirement by 4-6 weeks, a reticulocytosis by 8-10 weeks, and a gradual rise in hemoglobin level to normal by 12-20 weeks. A rise in total white cells with an absolute increase in polymorphonuclear forms developed during the 6th to 12th week of treatment. Platelet levels had improved by 12-16 weeks but have remained subnormal. Three of the children with acquired aplastic anemia received oxymetholone and prednisone as their only treatment and all have maintained their improvement for from 7 to 12 months off all medication. One 16-year-old boy with acquired aplastic anemia of 18 months' duration, and unimproved following a 6-month course of sublingual testosterone propionate and splenectomy, had a characteristic response to oral oxymetholone within 10 weeks. The fifth patient, with congenital aplastic anemia, had failed to improve during a 9-month course of sublingual testosterone propionate. Within 10 weeks on oral oxymetholone he had a reticulocytosis followed by a sustained rise in hemoglobin level. Virilization was noted in the 4 pre-pubertal patients with the dosages used (2.5 to 7.0 mg/kg/day). No advance in bone age or other side effects were observed. Oxymetholone is a useful, easily administered, new androgenic steroid for therapy of aplastic anemia and has proved effective in children unresponsive to testosterone. (SPR)

- 56 *The Adaptive 'Anemia' of Severe Protein Calorie Malnutrition (Marasmus).* NATHAN J. SMITH and ABRAHAM STEKEL*, King County Hospital, Univ. of Washington, Seattle, Wash.

A reduced hemoglobin concentration with normocytic, normochromic erythrocytes commonly occurs in severely marasmic infants. Severe marasmus has been produced in 20 piglets by feeding a balanced but restricted diet to stabilize their weight at 5 to 7 kg for up to 9 months. Eight additional piglets served as controls. Clinical, autopsy and biochemical observations show the similarity of this animal model to marasmus previously studied in human infants. Red cell indices, marrow morphology, transferrin iron, marrow iron stores and DFP³² erythrocyte life span are all normal and fail to indicate the presence of any specific nutritional deficiency that alters the production or survival of erythrocytes in marasmus. In spite of these findings the animals have a persistent but not progressive reduction of hemoglobin concentration (10 to 11 gms % compared to 15 to 16 gms % normal). Cr⁵¹ studies reveal a red cell mass deficit (16.5 ml/kg in 7 months, 6 kg pigs compared to 25 ml/kg in normal 6 kg pigs). The animals were stressed by controlled phlebotomy. A prompt erythropoietic response occurred with return to the prebleeding hemoglobin level. Small increases of food intake were consistently and rapidly followed by increased erythropoiesis as measured by reticulocyte counts, M:E ratio, and iron⁵⁹ kinetic studies. On the

basis of these results it is proposed that the impaired erythropoiesis in marasmus is not caused by a specific nutritional deficiency. The 'anemia' that is present represents an adaptation to the reduced metabolic demands of these undernourished subjects. The proliferative activity of the erythropoietic tissue may provide a sensitive measure of response to nutritional rehabilitation. (APS)

- 57 *Autoimmune Hemolytic Anemia in a Patient with Congenital Hypogammaglobulinemia.* HOWARD A. PEARSON, JOHN B. ROBBINS and RICHARD G. SKINNER*, Univ. of Florida, College of Medicine, Gainesville, Fla., and Children's Medical Group, Jacksonville, Fla.

Since the clinical findings of hypogammaglobulinemia (HGG) are explained by a deficient synthesis of circulating antibody, the development in such a patient of autoimmune hemolytic anemia (AHA), due to excessive production of a specific abnormal antibody is of interest. A six-year-old boy with HGG, of the sex linked variety, developed Coombs' positive AHA despite profound deficiencies of immunoglobulins (IgG 100, IgM 18, IgA 0 mg %). He had never received transfusion and penicillin had not been given for 3 months. Lymph node biopsy did not show malignant changes and cytomegalic virus could not be cultured. Direct and indirect Coombs' tests, using goat anti-human IgG and IgM sera, were positive. Eluted antibody was an IgG globulin. The serum reacted with all cells of a large panel but tests by Ortho Labs showed specificity against the public Rh antigen designated LW. The commercial gamma globulin used for therapy had no anti RBC activity. He has responded well to corticosteroids for 6 months, but has relapsed twice when this was discontinued. Although three adults with acquired HGG have developed AHA, this case represents the first instance in a patient with congenital HGG. All of the adults have had lymphoma or leukemia. Possibilities to explain this combination include graft vs host reaction with secondary 'runt' disease. Although unlikely in view of the patients age and lack of blood transfusions, investigations to examine this possibility are in process. Alternatively lymphoma may be present, and, if this proves true, speculations both on the nature of lymphoma and hypogammaglobulinemia are possible. (SPR)

- 58 *Inappropriate Glucose Consumption by the Erythrocytes of the Premature Infant.* FRANK A. OSKI, ERNESTINE P. BRIGANDI* and CHARLES F. SMITH*, Dept. of Pediatrics, Hosp. of Univ. of Pa. and Univ. of Pa. Sch. of Med., Philadelphia, Pa.

Although it is recognized that the red cells from premature infants consume more glucose than do the cells from adults no attempt has been made to determine if this increased glucose consumption is proportional to the younger mean age of the red cell population. Specific gravity separation revealed that 50 % of the red cells from the premature infant are as young as the youngest 10 % from adults. Red cell glucose consumption and lactic acid production was measured in 15 premature and 23 term infants, 23 adults and 12 subjects with reticulocytosis (mean 6.8 %). Glucose consumption was related to cell age expressed as a function of red cell G-6-PD and glutamic-oxaloacetate transaminase (GOT) levels, both enzymes particularly GOT showing marked variation in red cell populations of differing ages. Red cell glucose consumption ex-

pressed as $\mu\text{M}/\text{ml RBC's/h}/100 \text{ GOT u. averaged } 0.121$ in the adults, 0.094 in the group with reticulocytosis, 0.086 in the term infants and only 0.068 in the premature. When glucose consumption was expressed as a function of 100 G-6-PD units values averaged 1.01 in the reticulocytosis group, 0.86 in the adults, 0.80 in the term infants, and 0.64 in the premature. Both GOT/G-6-PD and lactate/glucose ratios were similar in the 4 groups. GOT averaged 2928 u/10¹⁰ RBC's in the reticulocytosis group, 2904 in the premature, 2499 in the term infants, and 1196 in the adults. The red cells of the premature infant appear to consume less glucose than would be expected from their young cell age. This finding suggests that 1 or more regulatory steps in glycolysis may be operating at different K_m 's or that these cells utilize other substrates as a source of energy. (SPR)

- 59 *Prevention of Hyperbilirubinemia of Prematurity by Phototherapy.* JEROLD LUCEY, MARIO FERREIRO* and JEAN HEWITT*, Department of Pediatrics, University of Vermont College of Medicine, Burlington, Vt.

The ideal treatment for hyperbilirubinemia of prematurity would be a safe and simple method for preventing its occurrence. CREMER *et al.* (1958) first demonstrated that serum bilirubin concentrations of newborn infants can be reduced by exposure to light. This treatment has not been widely used because of doubts as to its effectiveness and concern for the possible toxicity of the photochemical decomposition products of bilirubin. Recent experimental evidence indicated that these products are non-toxic. A controlled clinical trial has been carried out among 59 premature infants to test the effectiveness of artificial blue light in preventing hyperbilirubinemia of prematurity. Treated infants were placed in light from 12 to 144 hours of age and serial bilirubin determinations were carried out. The control and treated groups were comparable with respect to birth weight, gestational age, fluid intake and weight loss. The results are summarized below and indicate a statistically significant difference between the groups. Additional observations on the effect of phototherapy on serum albumin, H.A.B.A. dye binding capacity, free fatty acids and uric acid will be presented. (APS)

	Control	Light Treatment
Number of infants	31	28
Serum bilirubin—Mg %		
1st day	4.0 ± 0.5	3.7 ± 1.4
2nd day	7.5 ± 3.3	5.3 ± 1.4
4th day	9.7 ± 3.5	5.4 ± 1.9
6th day	8.2 ± 5.6	4.9 ± 2.2

- 60 *Indications for and Consequences of Intrauterine Transfusions.* PAUL JOHNSON*, ALAN MARGOLIS*, SUSIE FONG*, RODERIC H. PHIBBS* and WILLIAM H. TOOLEY*, Department of Pediatrics, Obstetrics, and the Cardiovascular Research Institute, Univ.-California-S.F. Medical Center, San Francisco, California (introduced by M.M. Grumbach).

We performed spectrophotometric analyses (technique of Liley) on 595 amniotic fluid specimens from 310 Rh-sensitized women; 1 or more specimens from 84 women had concentrations of pigment above levels which are generally considered to predict, with 95 %