

# ABSTRACTS

WILLIAM H. CROSBY, Lt.Col., MC, U.S.A., *Editor*

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ABSTRACTERS

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## ERYTHROPOIESIS AND CONTROL OF ERYTHROPOIESIS

HEME AND DRY MASS FORMATION DURING RED CELL DEVELOPMENT. *B. Lagerlöf, B. Thorell and L. Akerman.* From Department of Pathology, Karolinska Institute, Stockholm, Sweden. *Exper. Cell Research 10: 752-754, 1956.*

The growth of erythroblasts involves an increase in the amount of cellular proteins in the presence of cytoplasmic ribonucleotides. The formation of hemoglobin, which occurs rather late during the development, consists of two main components, the Fe-containing porphyrin derivative, -heme, which as a prosthetic group is bound to the protein globin. Quantitative cytochemical aspects of these relationships were investigated in bone marrow from adult albino rats by micro-interferometric and microspectrographic methods. The results from measurements of erythroblasts at various stages of hemoglobinization show that the main increase of cytoplasmic mass occurs during the earlier stages of the cell development, prior to the final synthesis of heme compounds.—*O. P. J.*

EVIDENCE FOR A RIBONUCLEOPROTEIN INTERMEDIATE IN THE SYNTHESIS OF GLOBIN BY RETICULOCYTES. *M. Rabinovitch and M. E. Olson.* From Department of Physiological Chemistry, University of California School of Medicine, Berkeley, Calif. *Exper. Cell Research 10: 747-749, 1956.*

Ribonucleic acids are controlling factors in protein synthesis and since reticulocytes incorporate radioactive leucine principally into hemoglobin, there is the possibility that a ribonucleoprotein precursor to hemoglobin may be found in reticulocytes. In order to investigate this, rabbit reticulocytes were prepared by daily intramuscular injections for one week of neutralized phenylhydrazine hydrochloride together, with folic acid and vitamin B<sub>12</sub> supplements. After the proper incubation in a Warburg flask with a solution of L-leucine uniformly labeled with carbon 14, the contents were immediately frozen. After partial thawing and subsequent disintegration by a magnetostriiction oscillator, the particulate matter was separated by differential centrifugation. Incorporation was essentially complete before 10 minutes when tracer levels of radioactive leucine were used. During this time the microsomal fraction had incorporated and subsequently lost radioactive leucine. After 10 minutes the radioactive leucine can be almost completely recovered in the soluble protein and is associated only with the hemoglobin. The marked initial incorporation of radioactive leucine into the microsomal protein may, therefore, be considered to reflect a step in the formation of hemoglobin.—*O. P. T.*

**NITROGEN METABOLISM DURING ERYTHROCYTE MATURATION; NPN FORMATION AND HEMOGLOBIN SYNTHESIS.** *H. G. Schweizer and S. Rapaport.* Physiolog.-Chem. Institut der Humboldt Universität Berlin. Hoppe-Seylers Zschr. Physiol. Chem. 306: 35-41, 1956.

Experiments are described to show the significance of the increase of NPN formation in incubated reticulocytes with relation to hemoglobin synthesis. It is attempted to demonstrate that the reticulocyte stroma as the source of NPN formation. Reticulocytes show an increased NPN content following incubation in normal saline. If glucose and 11-amino-acids are added to the incubation medium this increase does not occur. On the other hand hemoglobin synthesis is enhanced under the latter conditions, with an optimal effect in the presence of high concentrations of phosphate. NPN formation is inhibited by 2,4-dinitrophenol. Mature erythrocytes do not show this phenomenon.—*M.-H. H.*

**INVESTIGATION OF ARTERIAL OXYGEN SATURATION IN CHRONIC ANEMIAS.** *R. Zeilhofer, C. G. Bär and K. Heckel.* From the Med. Univ. Klinik, Erlangen. Zschr. klin. Med. 154: 216-226, 1956.

In 24 patients with chronic anemia the oxygen saturation of the arterial blood was more or less decreased. With severe anemia the peripheral utilization of oxygen is significantly increased with a consequent relative rise of the reduced hemoglobin in the venous blood. The arterial oxygen saturation is proportionally decreased.

The possibility is discussed that the lowering of the arterial oxygen saturation may be caused by an increased venous inflow of reduced hemoglobin through physiologic intrapulmonary anastomoses. The compensation mechanisms in chronic anemia are mentioned. The necessity is emphasized, that in regard to the significance of the oxygen saturation as a diagnostic means in heart and lung diseases the hemoglobin level has to be taken into consideration.—*M.-H. H.*

**THE BONE MARROW IN ISCHAEMIA.** *D. A. Sugarman.* Sydney. M. J. Australia 2: 913-916, December, 1956.

This paper describes the bone marrow of the femur and tibia in eleven ischemic lower limbs amputated because of marked arterial disease. The author concludes that "on the assumption that the bone marrow concerned has suffered some degree of ischaemia, no evidence was found that ischaemia directly stimulated erythropoietic activity."—*G. C. de G.*

**SEASONAL VARIATIONS IN HEMATOPOIESIS IN THE DERMAL BONES OF THE NINE-BANDED ARMADILLO.** *L. P. Weiss and G. B. Wislocki.* From Department of Anatomy, Harvard Medical School, Boston, Mass. Anat. Rec. 126: 143-163, 1956.

The nine-banded armadillo should become a valuable laboratory animal for experimental studies of hematopoiesis because it has over 500 marrow-bearing, bony dermal plates which are readily available for aspiration, roentgenography or biopsy. Apparently environmental temperature constitutes an important factor regulating dermal hematopoiesis. In the spring, summer and fall, the volume of the marrow cavities of the dermal bone was greater and the marrow was much redder than in the winter. In winter, the marrow was a dull gray-white. Hematopoietic cells were present in the fall and spring and virtually absent in winter. Skeletal bone marrow from the ribs and proximal femora were grossly and microscopically similar in all 11 animals (7 male and 4 female) irrespective of the season. White and red blood cell counts showed nothing unusual.—*O. P. J.*

**THE RELATIONSHIP OF TOTAL RED CELL MASS TO LEAN BODY MASS IN MAN.** *F. P. Muldowney.* From the Department of Medicine, University of Edinburgh, Scotland. Clin. Science 16: 163-169, 1956.

Lean body mass is believed to bear a constant relationship to total body water (lean body mass = total body water  $\times \frac{100}{73}$ ). Antipyrine was used to measure total body water in 22 normal subjects. Red cell mass was measured from the hematocrit reading and the plasma

volume as estimated by Evans blue. The thiocyanate space is believed to indicate extracellular fluid and the lean body mass can also be calculated from  $A + (0.563)(A - E)$  where  $A$  = antipyrine space and  $E = 0.7$  (thiocyanate space). The latter calculation gave a systematically higher estimate than the former. Correlation of red cell mass with total body weight was unsatisfactory, but the correlation of red cell mass with lean body mass was good, the relationship being given by the equation  $y = 32.74x + 155.17$  where  $y$  = red cell mass and  $x$  = lean body mass.—*R. H. G.*

### PIGMENTS AND PORPHYRIA

**ERYTHROPOIETIC PORPHYRIA. PRELIMINARY NOTE UPON 3 CASES.** *N. A. Guimarães, A. B. Monteiro, A. Lisboa, and C. Pereira da Costa.* Faculdade de Medicina, Univ. de Baia. Brazil. *O Hospital* 51: 33-43, 1957.

Three cases of erythropoietic porphyria, in three brothers, are described. These cases are to be added to the 34 published up to May 1955.—*M. A. J.*

**$\delta$ -AMINOLAEVULIC ACID AND PORPHYRIA.** *A. Jarrett, C. Rimington, and D. A. Willoughby.* From the University College Hospital Medical School, London, England. *Lancet*, 1: 125-127, 1957.

It has previously been shown that porphobilinogen and  $\delta$ -aminolaevulic acid have no pharmacological actions which would explain the occurrence of hypertension, tachycardia, abdominal pain, and neurological manifestations in patients with acute hepatic porphyria. However, Scott, in a self-experiment, noted that ingestion of  $\delta$ -aminolaevulic acid was followed by transitory hypersensitivity to sunlight. In extending this observation, it has now been found that subcutaneous injection of  $\delta$ -aminolaevulic acid, followed by exposure to radiation from a carbon-arc lamp, results in extensive blister formation, collagen damage, and lymphocytic infiltration in the skin and subcutaneous tissue. No such changes were present after injection of  $\delta$ -aminolaevulic acid alone, after radiation alone, or after injection of porphobilinogen followed by radiation. The possible significance of these findings are discussed.—*R. S.*

**THE NEUROPATHOLOGY OF ACUTE PORPHYRIA.** *J. B. Gibson and A. Goldberg.* From the Department of Pathology, University and Western Infirmary, Glasgow, and the Department of Chemical Pathology, University College Hospital Medical School, London, England. *Journal of Pathology and Bacteriology*, 71: 495-509, 1956.

Studying autopsy material from five fatal cases of acute porphyria, the authors have found: small foci of demyelination in the brain and a scattered patchy demyelination of peripheral nerves. Retrograde degeneration of nerve cells was common, but porphyrin fluorescence could not be demonstrated in frozen sections of formalin-preserved material. The findings suggest that the nerve lesions do not result directly from a toxic action of porphobilinogen or of uroporphyrin.—*R. S.*

**BILIRUBIN ENCEPHALOPATHY: STUDIES RELATED TO THE SITE OF INHIBITORY ACTION OF BILIRUBIN ON BRAIN METABOLISM.** *W. R. Bowen and W. J. Waters,* Syracuse, New York. *J. Diseases Child.* 93: 21-22, 1957.

It is suggested that in the brain, bilirubin produces a reversible inhibition at the pyridine nucleotide level. This metabolic effect would explain the inhibition in aerobic brain metabolism observed in vitro and the bilirubin encephalopathy in vivo.

In the discussion, several technical difficulties complicating this type of experiment are stressed, and a somewhat different interpretation of the results is proposed.—*R. S.*

**PAPER ELECTROPHORESIS OF PORPHYRINS.** *T. K. With.* From the Central Laboratory, Svendborg County Hospital, Svendborg, Denmark. *Scand. J. Clin. & Lab. Invest.* 8: 113-117, 1956.

A simple method for paper electrophoretic analysis of porphyrins is described. For direct analysis of urinary porphyrins, a minimal concentration of 5  $\mu$ g. per ml. is desirable.—*R. S.*

## RED CELL STRUCTURE AND FUNCTION

THE STREAMING TRANSPARENCY IN THE SUSPENSION OF RED BLOOD CELLS. *Kaichiro Kuroda.*

From the Dept. of Biochemistry, School of Medicine, University of Tokushima, Tokushima. *Acta Haemat. Jap.* 19: 387-406, 1956.

The streaming transparency, transparency by a light from vertical direction to the flow of streaming, of red blood cell suspension is determined by sphericity and optical density of erythrocyte, the latter being composed of two factors, the concentration of materials inside and the transparency of the membrane of erythrocyte. This was measured in various diseases by an apparatus designed by the author.

The streaming transparency in familial hemolytic anemia was found decreased. The degree of decrease, moreover, was far prominent than the degree of erythrocyte sphericity. Meanwhile, an increase of it in anemia of allergic diseases such as bronchial asthma and rheumatic disease was found, in spite of the normal size of erythrocyte. Therefore, the transparency of the erythrocyte membrane was considered to be decreased in hemolytic anemia and increased in allergic diseases. These findings were confirmed also in some experimental studies. The condition of the membrane of erythrocyte seemed to be measured to some extent by this new method.—*K. M.*

THE KINETICS OF CARDIAC GLYCOSIDE INHIBITION OF POTASSIUM TRANSPORT IN HUMAN ERYTHROCYTES. *A. K. Solomon, T. J. Gill, 3rd and G. L. Gold.* From Biophysical Laboratory of Harvard Medical School, Boston, Mass. *J. Gen. Physiol.* 40: 327-350, 1956.

The present study of the kinetics of the inhibition of K transport in glycoside-poisoned human red cells was undertaken in an effort to throw more light on the detailed mechanism by which K enters the normal cell.—*O. P. J.*

THE PERMEABILITY OF ERYTHROCYTE GHOSTS. *W. D. Stein.* From Zoology Department, King's College, London, Eng. *Exper. Cell Research* 11: 232-234, 1956.

It is possible to prepare erythrocyte ghosts by gentle hypotonic hemolysis which behave as almost perfect osmometers in determining the potassium and sodium permeability. In the present report, permeability measurements were made by the photometric method of Orskov of cells in isotonic saline media containing glycerol monoacetate, a  $\gamma$ -propylene glycol, glycerol, or 1:2:4 butan-triol. In the last two cases, copper sulphate was used as an inhibitor. The results indicate that ghosts prepared by gentle hypotonic hemolysis possess a selective permeability barrier and that this barrier is of much the same nature as in the intact cell. It appears that even after structural reorganization of the cell membrane necessary for the outward passage of hemoglobin molecules during hemolysis, the membrane can be reconstituted so as to present a largely unaltered barrier toward permeating molecules.—*O. P. J.*

THE KINETICS OF GLUCOSE TRANSPORT THROUGH THE HUMAN RED CELL MEMBRANE. *W. Wilbrandt, S. Frei and T. Rosenberg.* From Department of Pharmacology, University of Berne, Switzerland. *Exper. Cell Research* 11: 59-66, 1956.

Because of the well-known deviations from prediction assuming penetration by simple diffusion, and the conflicting interpretations in the literature, the transport of glucose in both directions across the human red blood cell membrane was studied using improved osmotic methods.—*O. P. J.*

PARTICIPATION OF COZYMASE IN THE FORMATION OF 2,3-DIPHOSPHOGLYCERINIC ACID. *N. B. Chernyak.* *Biokhimii, Moscow*, 19(1): 50-57, 1954.

The investigation of the central reaction of glycolysis, as a result of which there is formed 2,3-diphosphoglycerinic acid, was conducted on dialyzed hemolysates of man, in which ATP was destroyed by preliminary 24-hour incubation. To the hemolysate one added fructose diphosphate, inorganic phosphate, radioactive phosphorous (P32), sodium fluoride

and salt of magnesium. To the separate test tubes of the hemolysate, one added, in addition to this, some DPN or ATP.

In the study of the radioactivity of the fraction of phosphoglycerinic acid it was shown that the basic method of the formation of 2,3-diphosphoglycerinic acid consists in the direct shifting of the phosphate residue of 1,3-diphosphoglycerinic acid from the position 1 to the position 2 without the stage of the formation of monophosphoglycerinic acid. The reaction takes place in the absence of ATP with the employment of inorganic phosphate with participation of DPN. The basic substrate of the reaction is the phosphoglycerinic aldehyde. The formation of a very small quantity of 2,3-diphosphoglycerinic acid by the shifting of the labile phosphate group ATP to 3-phosphoglycerinic acid indicates that this mechanism of reaction in the hemolysates (erythrocytes) of man is not basic. (Author abstract)—*A. A. B.*

**BANDING IN SALAMANDER ERYTHROCYTES. A SHAPE CHANGE CORRESPONDING TO DISC-SPHERE TRANSFORMATION IN MAMMALIAN RED CELLS.** *W. D. Trotter.* From Department of Human Anatomy, University of Oxford, Oxford, England. *Exper. Cell Research 11: 587-603, 1956.*

The phenomenon of banding was first observed by Barer during studies on the micro-spectrography of single salamander red cells, when he noticed a non-specific notching of the absorption curve from the cytoplasmic portion of the cell. Preliminary observations have since shown that the banded appearance is due to changes in cell shape, the surfaces of the erythrocyte having become corrugated. The alternating light and dark striations, as seen by phase microscopy, vary in number and orientation and in many cells the corrugations on the two surfaces appear as convexities and concavities opposite each other. The conditions producing banding are very similar to those causing disc-sphere transformation in mammalian red cells, especially the disc-sphere transformation between slide and cover-slip. Banding occurs: (a) when the cells are mounted in a saline medium, which is free of plasma albumin, and of alkaline pH provided the surfaces of the slide or cover-slip (or the medium itself) are contaminated with a lipoid "banding" (or sphering) factor; (b) in plasma-albumin-free medium containing small (usually sublytic) quantities of hemolysins.—*O. P. J.*

**SPECIFICITY IN THE ALDEHYDE-COUPPLING REACTIVITY OF NUCLEATED ERYTHROCYTES.** *M. A. Lessler.* From Department of Physiology, Ohio State University College of Medicine, Columbus, Ohio. *J. Histo. and Cytochem. 4: 36-40, 1956.*

Evidence has been accumulating that the genetic potential of a cell is linked with desoxyribose nucleoprotein and that the latter has a species difference with respect to the type and distribution of the purines and pyrimidines. Although these differences are not demonstrable in the intact cell, the presence of specific chemical configurations in the desoxyribose nucleic acid of various species should result in differences in reactivity. Nucleated erythrocytes from the Congo eel, mud puppy, leopard frog, bull frog, Mexican axolotl and chicken were studied with the usual Feulgen procedure and after exposure to various aldehyde-coupling reagents, such as: bisulphite, semicarbazide, phenylhydrazine, hydroxylamine, and Girard reagent. Coloration of the nuclei was assessed by visual observation and cytospectrophotometry. Characteristic variations from species to species of the inhibition of Feulgen coloration was observed. These differences are interpreted as qualitative differences in the reactivity of the desoxyribose nucleic acid complexes in the 6 species studied.—*O. P. J.*

**ELECTRON MICROSCOPIC OBSERVATIONS ON GRANULES AND FILAMENTS (RETICULOSOMES) OF RETICULOCYTES.** *A. Brunner, Jr. and A. Vallejo-Freise.* From Butantan Institute, São Paulo, Brazil. *Exper. Cell Research 10: 55-62, 1956.*

There is no uniformity of opinion about the nature of micro-structures observed in reticulocytes and it still remains to be cleared whether granules and filaments visualized in the optical microscope are pre-existent or may be attributed to the action of stains, fixatives or

hemolytic systems. In order to investigate this, electron micrographs were made of suspensions or their smears of heart or peripheral blood, obtained from guinea pigs 4 to 7 days after bleeding or hemolysis by various methods. The observations suggest the pre-existence of integrant elements in reticulocytes. Four different forms of reticulosomes may be distinguished, namely, granular, circular forms, large filaments and fine filaments. In correspondence to the hemolytic conditions, there were observed in the reticulocyte fine filaments attached to an irregular shaped mass or only circular forms. It can be assumed that without previous partial drying filaments undergo disintegration during the hemolytical process in distilled water and these change into circular forms.—*O. P. J.*

ELECTROMICROSCOPIC STUDIES OF THE INNER STRUCTURE OF NON-NUCLEATED ERYTHROCYTES. II. FINDINGS IN A CASE OF SICKLE CELL ANEMIA. *C. Wolpers*: Johnson Foundation for Medical Physics. University of Pennsylvania, Philadelphia. *Klin. Wschr.* 2: 57-62, 1957.

The hemoglobin structures of normal red blood cells and erythrocytes from a patient with sickle cell anemia are compared. The hemoglobin of the normal erythrocyte has two structural elements: a finely granulated or filamentous ground substance, and staff structures which are arranged in pairs. In sickle cell anemia the finely granulated substance has disappeared. The total inner structure is transformed into coarse staff structures which are much longer than in normal cells, and possess a diminished osmophilia. In a certain number of the patient's erythrocytes square or elliptic bodies with a high resistance to hemolysis could be detected. They seem to be a specific element of the sickle cell.—*M.-H. H.*

ELLIPTOCYTES. *F. Jung*: Geschwulstklinik d. Charité u. d. Institut für Pharmakologie und Toxicologie d. Humboldt-Universität Berlin. *Klin. Wschr.* 1: 44-46, 1957.

Elliptocytes, e.g. red blood cells with an elliptic form, are occasionally seen in man as a constitutional anomaly without severe pathologic findings. They may be accompanied by slight icterus and mild anemia. They occur normally in various animal species. While the animal elliptocytes appear to be a primitive form of the erythrocytes, the human elliptocytes are defective forms with a deficiency in ion content and transportability, and with a decrease of certain structural components of the cell. The human and animal elliptocytes were studied electromicroscopically and by osmotic and metabolic tests. Their reactions and structures are compared.—*M.-H. H.*

## DEFICIENCY ANEMIA

EARLY HYPOFERREMIA AS AN INDEX OF ERYTHROPOIETIC RESPONSE IN NUTRITIONAL MACROCYTIC ANEMIA. *J. B. Chatterjea, S. K. Ghosh, R. N. Ray, A. K. Basu, D. K. Banerjee*. Department of Hematology, School of Tropical Medicine. *Bulletin Calcutta School of Tropical Medicine* 4: 156, 1956.

In uncomplicated nutritional macrocytic anemia serum iron is normal or high and iron-binding capacity depressed. Significant fall in serum iron was consistently observed in all the cases showing satisfactory hemopoietic response. In most of the cases the sharp fall in serum iron level was observed earlier than the reticulocyte peak, within 48 to 72 hours of the institution of therapy with anti-megaloblastic drugs.—*J. B. C.*

HAEMATOLOGICAL CHANGES IN NUTRITIONAL OEDEMA SYNDROME (KWASHIORKOR). *Geeta Mehta and C. Gopalan*. Nutrition Research Laboratories, Indian Council of Medical Research, Coonoor, India. *Ind. Jour. Med. Res.* 44: 727-736, 1956.

Studies in 15 cases of Kwashiorkor indicate anemia in this condition may arise from deficiency of protein, iron or liver principle. In the evolution of anemia, both deficient supply as well as defective utilization are present. On admission, all the cases showed pronounced depression of gastric acid which tended to return to normal levels after therapy.—*J. B. C.*

ANAEMIA IN ANKYLOSTOMIASIS. *V. G. Daffary and Y. M. Bhende*. Department of Pathology and Bacteriology, Seth G. S. Medical College, Bombay, India. *J. of Post-graduate Medicine* 2: 44-50, 1956.

Hematologic and other findings in a series of 96 cases of ankylostomiasis are reported. Anemia was present in 74 cases of which 22 showed megaloblastic bone marrow. These cases with megaloblastic marrow appeared to be instances of nutritional macrocytic anemia complicated by hookworm infestation. In the remaining 52 cases the marrow was normoblastic; anemia was microcytic in 23, normocytic in 21 and macrocytic in 8. Pathogenesis of anemia is briefly discussed.—*J. B. C.*

HEMATOLOGICAL FINDINGS IN NUTRITIONAL OEDEMA AND KWASHIORKOR. *K. L. Mukherjee, R. N. Chaudhuri and J. B. Chatterjea*. From the Department of Biochemistry and Hematology, School of Tropical Medicine, Calcutta. *Bulletin Calcutta School of Tropical Medicine* 4: 169, 1956.

Hematological findings in a series of 112 patients suffering from nutritional edema and 43 children with Kwashiorkor are reported. The nutritional edema group could be divided into 2 groups according as they were gaining in (Group A) or losing (Group B) edema on rest and high-protein diet. In Group A, the average Hb. and R.B.C. levels on admission were  $10.15 \pm 1.21$  Gm.% and 3.2 million respectively. In Group A after 3 weeks when the patients were recovering from edema the Hb. and R.B.C. levels dropped to 7.13 Gm. and 2.48 million respectively. Subsequently Hb. and R.B.C. gradually reached normal values. In Group B, on the other hand the values showed progressive improvement from the very beginning. The mean liver iron content in the 6 cases of nutritional edema was  $54 \pm 9$  mg.% which after clinical cure decreased to  $18 \pm 5$  mg.%.

In Kwashiorkor the initial mean Hb. content was  $8.1 \pm 1.3$  Gm.% which reached normal level after about 6 weeks' therapy. The mean liver iron content was  $34 \pm 4$  mg.% which decreased to 15 mg.% after recovery.—*J. B. C.*

THE RELATION OF ANAEMIA OF PREGNANCY IN FIJI TO ASCORBIC ACID DEFICIENCY. *D. J. Oldmedow*. From the Colonial War Memorial Hospital, Suva, Fiji. *M. J. Australia*, 2: 281-824, 1956.

In Fiji there exist two races, Fijian and Indian. They show a pronounced contrast in their incidence of pregnancy anemia, which occurs almost entirely in the Indians. The anemia shows a definite seasonal incidence, the main peak of incidence being between July and October, with a second peak in March. The author presents evidence which suggests that in patients taking diets inadequate in iron and hematopoietic factors generally, a seasonal deficiency of ascorbic acid may precipitate the occurrence of a severe and also seasonal anemia.—*G. C. de G.*

IRON ABSORPTION BEFORE AND AFTER PARTIAL GASTRECTOMY. *M. D. Smith and B. Mallett*. From the Nuffield Department of Clinical Medicine, Radcliffe Infirmary, Oxford, England. *Clin. Science*, 16: 23-24, 1957.

Varying reports have been given about the incidence of iron deficiency anemia after partial gastrectomy for peptic ulcer, the reported incidence varying from negligible numbers to 50%. In this investigation, 28 patients with peptic ulcer who were not anemic and who gave no history of frank hematemesis or melena were investigated while awaiting operation, and at intervals after it. Of these, 22 had a partial gastrectomy, 6 by the Polya and 16 by the Billroth I technique. In addition, studies were made on 27 patients who had had a Polya operation 1 to 5 years previously. Test doses of 5 mg. of iron labelled with  $^{59}\text{Fe}$  were used; it was given by mouth as a solution of ferrous sulphate with 50 mg. of ascorbic acid. No gross impairment of iron absorption was found, and patients who became anemic did not show impairment of iron absorption. Occult blood loss probably plays an important part in the development of iron deficiency after partial gastrectomy. Further studies using labelled food iron are, however, desirable.—*R. H. G.*