instances, the presence of some obstruction to the outflow of bile is indicated by the clinical features of dark urine and pale stools and a positive van den Bergh test in the serum.

It has been shown that the changes in the erythrocytes occur as the result of alterations in cells that are already circulating in the blood at the onset of the jaundice, and not because of altered erythropoiesis.

The changes in the red cells may be present to a marked degree as early as ten days after the onset of the jaundice. The possibility of this being the result of a new generation of cells is precluded by the fact that erythropoiesis would have to proceed at about ten times the normal rate, and yet no increase in the reticulocytes is seen. Likewise, in recovering cases the blood is restored to normal in as little as ten days, again without signs of rapid cell regeneration.

If red cells are transfused into a jaundiced patient, the transfused cells can be shown to take on the characters described above in about a week. Some mechanism, therefore, exists for producing these changes in circulating red cells.

The bone marrow in jaundice shows no abnormality that could be responsible for the alterations found in the circulating cells.

Detailed analysis of the changes in the chemical constitution of the blood in non-hæmolytic jaundice shows that none of these alterations is responsible for the changes in the red cells.

It is suggested by comparison with the red-cell changes found after splenectomy that the changes in the erythrocytes in jaundice of the non-hæmolytic variety are due to functional disturbance in the circulation of the spleen in jaundice.

Changes in circulating erythrocytes in the direction of roundness in cases of hæmolytic anæmia have received much prominence in recent years. It is suggested here that the opposite change, flattening, also results from alterations in cells as they circulate in the peripheral blood stream.

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Siderocyte Levels in 'Normal' Human Beings

FOLLOWING the partial elucidation of the physiological properties of the siderocyte as the normal ageing erythrocyte[1] and in view of pathological studies now in progress, it became desirable to establish 'normal' siderocyte levels in human beings, and to study the effects of sex, age, menstrual cycle, diurnal variation, iron therapy and exercise upon such levels.

Below are summarized the results of such an investigation carried out in the University of Birmingham.

The differences of the means between the age-groups in the female do not at any point attain statistical significance, but the first and last age-groups in the male do attain a significant difference of mean from their neighbouring groups. The difference between the means for the male and female is also significant. Both series, grouped in 0·1 per cent siderocyte-class intervals, approximate fairly well to 'normal' distributions.

Daily siderocyte counts throughout two successive menstrual cycles in each of two female subjects showed no cyclical tendency. Hourly siderocyte counts on six subjects revealed no evidence of diurnal variation. The exhibition of fairly large doses of ferrous sulphate (up to 1,500 mgm. iron daily) for periods up to 21 days did not affect siderocyte levels in four subjects.

AN ANALYSIS OF SIDEROCYTE LEVELS IN 279 'NORMALS' BETWEEN THE AGES OF 5 AND 65 YEARS.

Total series.

Age group	5–	15–	25–	35–	45–	55–65	All ages
Number of subjects	32	118	46	30	29	24	279
Mean (%)	0·37	0·52	0·48	0·56	0·52	0·48	0·50
S.D.	0·29	0·24	0·29	0·23	0·25	0·15	0·25
Coefficient of variation	77%	47%	62%	41%	48%	31%	50%

Male series.

Number of subjects	16	68	24	17	17	12	154
Mean (%)	0·32	0·50	0·41	0·53	0·51	0·40	0·46
S.D.	0·15	0·23	0·27	0·19	0·28	0·15	0·23
Coefficient of variation	48%	45%	66%	36%	57%	37%	50%
P for diff. of successive means		0·01	0·15	0·15	0·8	0·001	

Female series.

Number of subjects	16	50	22	13	12	12	125
Mean (%)	0·43	0·55	0·55	0·59	0·55	0·57	0·54
S.D.	0·29	0·26	0·31	0·25	0·21	0·10	0·27
Coefficient of variation	77%	48%	57%	46%	37%	17%	50%
P for diff. of successive means		0·15	0·9	0·65	0·65	0·8	

Grand mean: Male 0·46; Female 0·54; Difference 0·08. $P = 0·01$.

Moderately severe exercise (sprinting 440 yards) produced no change in level immediately afterwards in each of four subjects, but the injection of small doses of adrenalin, which is without effect on blood *in vitro*, produced an immediate but transient rise of up to 2 per cent, falling to normal in 1½ hours, in six subjects. In our view, this response is probably due to splenic contraction, since Granick[2] has shown numerous siderocytes in teased spleen preparations.

Siderocytes are thus shown to be normal and constant inhabitants of circulating peripheral blood in normal human beings, there being a slight sex difference in level. For most practical purposes, however, a value of $0·5 \pm 0·3$ per cent will serve as the 'normal' level for human beings above the age of five years. Higher levels have been reported in infants[3], but so far no information is available as to when the level becomes stabilized.

Exercise, iron therapy, and menstruation do not appear to influence the siderocyte levels herein established, nor do they show diurnal variation.

Full details of this investigation will be published elsewhere.

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[1] Case, *Nature*, **152**, 599 (1943).
[2] Granick, *Proc. Soc. Exp. Biol. N.Y.*, **53**, 255 (1943).
[3] Doniach, Grüneberg and Pearson, *J. Path. Bact.*, **55**, 23 (1943).