There is an unexpected difference in the distribution of accidents in the nulliparous and parous women (Fig. 2); for in the nulliparous women the accidents occur predominantly during the premenstruum, while in the parous women a high incidence occurs during both the premenstruum and the menstruation. This difference is not associated with marital state, for married women with no children tended to be more accident-prone during the premenstruum. Nor was there any tendency for the time of accident-proneness to differ among the women with one child from the women with many children. It may be that, whereas the nulliparous woman tends to have a heavy menstrual loss from the first day, the parous woman often has a slight loss for one to three days before the full menstrual flow begins. If lethargy of the premenstruum is due to water retention, which is relieved by the full menstrual flow, then one would not expect all parous women to be relieved of their lethargy until the fourth day of menstruation.

Only 13 women had previously been involved in an accident, and these were evenly scattered among the seven four-day periods. Sixty-two women described their previous health as "good," 15 as "moderate," and 7 as "poor," and these also were evenly distributed throughout the cycle.

Conclusions

In this survey 44 (52%) of a total of 84 regularly menstruating women were involved in an accident during menstruation or the four days before menstruation. The significance of menstruation as a factor affecting accident-proneness persisted among home, road, and factory accidents, while women were performing routine actions, and among the active and passive participants of an accident. It is suggested that the increased lethargy of menstruation and the premenstruum is responsible for both a lowered judgment and slow reaction time. Schoolgirls' work deteriorates during menstruation (Dalton, 1960a), and they are more likely to be punished for unpunctuality and forgetfulness during menstruation (Dalton, 1960b). Wickham (1958) found that the intelligence-test scores in women Army personnel were lowered during menstruation, but, surprisingly, this did not hold for the practical/mechanical performance test.

These findings cause one to consider the wisdom of administering tranquillizers for premenstrual tension, which may well increase accident-proneness at the most dangerous time of the menstrual cycle. One wonders if awareness by women that they are more accident-prone at certain times of the month will enable them to use greater care in avoiding accidents, or will it merely induce a menstrual neurosis? Women who have had an artificial menopause appear more accident-prone than those whose menopause was natural.

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IRON-DEFICIENCY ANAEMIA IN EUROPEAN AND WEST INDIAN INFANTS IN LONDON

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The high incidence of anaemia in West Indian infants which was found during a study of atopic eczema (Marten, Sarkany, and Davis, 1960) led to the present investigation. Anaemia due to dietary deficiency, intestinal worms, or a combination of the two is common in negro children living under tropical conditions (Wolman, 1957). Munday *et al.* (1938) studied the haemoglobin levels of negro and white infants living under similar conditions in a non-tropical area. They showed that from the age of 4 months onwards negro infants in the United States had lower haemoglobin levels.

The present study compares the haemoglobin levels of West Indian and European infants suffering from eczema with healthy control groups. The West Indian infants were all born in this country and had never lived abroad. The healthy infants, drawn from local day nurseries, had no history of eczema and had no known illness at the time of examination.

Methods.—The haemoglobin level and packed cell volume were measured on capillary blood using Haldane's technique (100% = 14.8 g./100 ml.) and micro-haematocrits. From these the mean corpuscular haemoglobin concentration (M.C.H.C.) was calculated. All the West Indian infants were tested for sickling, and "cellophane" swabs and stools were examined for ova. Eczematous infants with haemoglobin levels below 70% (10.3 g./100 ml.) were treated with oral iron (elixir of ferrous gluconate).

Results

Excluding four infants with positive sickling tests, 114 infants, whose ages ranged from 5 to 23 months, were investigated. Of these, 54 had atopic eczema (West Indian 21, European 33) and 60 were healthy (West Indian 26, European 34).

The infants in these four groups had comparable birth weights and age ranges, while the healthy infants had similar weights at the time of examination. With Fisher's "t" test no statistically significant difference between the means of these values could be demonstrated (Table I).

Statistical comparisons of the mean haemoglobin levels and the mean M.C.H.C.s for both West Indian and European groups have been made, and the results are shown in Table II. It will be seen that for each race there was no significant difference between the eczematous and healthy groups. However, when the two races were compared the mean haemoglobin levels

TABLE I

Groups Studied	No. of Infants	Age (Months)		Birth Weight (oz.)		Present Weight (oz.)	
		Mean $\pm$ S.D.	Range	Mean $\pm$ S.D.	Range	Mean $\pm$ S.D.	Range
West Indian	21	12.8 $\pm$ 5.5	5-22	111.5 $\pm$ 12.8	70-146	—	—
A. With eczema	26	13.4 $\pm$ 5.3	5-22	111.4 $\pm$ 15.2	83-136	349.2 $\pm$ 74.9	199-508
B. Healthy	33	12.9 $\pm$ 5.2	5-23	115.1 $\pm$ 15.1	89-150	—	—
C. With eczema	34	13.4 $\pm$ 4.9	5-23	115.7 $\pm$ 17.2	89-145	347.8 $\pm$ 63.7	288-473
D. Healthy							
Comparing Groups	n	t	p	t	p	t	p
A and B	45	0.358	0.7	0.033	>0.9	—	—
A " C	52	0.028	>0.9	0.882	0.2	—	—
A " D	53	0.374	0.7	0.930	0.2	—	—
B " C	58	0.024	>0.9	0.980	0.2	0.077	>0.9
B " D	57	0.331	0.7	0.920	0.2	—	—
C " D	65	0.401	0.6	0.139	0.8	—	—

TABLE II

Group*	No. of Infants	Haemoglobin (%) (g./100 ml.)		M.C.H.C. (%)	
		Mean $\pm$ S.D.	Range	Mean $\pm$ S.D.	Range
A	21	60.9 $\pm$ 8.9 (9.0 $\pm$ 1.3)	48-86 (7.1-12.7)	27.6 $\pm$ 1.0	21-34
B	26	62.3 $\pm$ 10.0 (9.2 $\pm$ 1.5)	40-78 (5.9-11.5)	29.0 $\pm$ 2.8	22-33
C	33	73.8 $\pm$ 6.8 (10.9 $\pm$ 1.0)	54-80 (8.0-11.8)	30.6 $\pm$ 2.0	25-35
D	34	72.1 $\pm$ 6.1 (10.6 $\pm$ 0.9)	58-84 (8.6-12.4)	31.4 $\pm$ 1.9	27-35
Comparing Groups	n	t	p	t	p
A and B	45	0.64	0.5	1.47	0.1
A " C	52	5.89	<0.001	4.07	<0.001
A " D	53	5.40	<0.001	5.23	<0.001
B " C	57	4.53	<0.001	2.63	0.02
B " D	58	4.41	<0.001	3.90	<0.001
C " D	65	1.06	0.2	1.47	0.1

*See Table I for particulars of grouping.

and M.C.H.C.s were significantly lower in the West Indian infants.

Thus it appeared that the West Indian infants with atopic eczema had lower haemoglobin levels than their European counterparts, but since similar results were obtained in the healthy groups these findings were considered incidental and unrelated to the atopic eczema.

In order to determine whether the differences in haemoglobin levels occurred throughout the age range of 5 to 23 months the infants were divided into three-monthly age-groups. As the findings in the eczematous and healthy infants of each race were similar they have been combined (Fig. 1).

The West Indian infants had lower means, and, with one exception, lower ranges in each three-months period. In each race there was a fall in the mean levels up to the age of 1 year, followed by a rise, which was perhaps slower in the West Indians. The maximum difference between the means (14.4%, or 2.1 g./100 ml.) was found in the 17 to 19 months age-group.

The lower mean M.C.H.C.s as well as the lower mean haemoglobin levels in the West Indians indicated a higher incidence of iron deficiency. An indication of the incidence of iron deficiency was obtained by excluding children with normal M.C.H.C.s. For this purpose 30% was taken as the lower limit of normal, as in our experience values as low as 30% have been found in children whose haemoglobin levels were well within the adult range. Among the West Indian infants 53.5% (25/47) had M.C.H.C.s below 30%, compared with 22.4% (15/67) of the European infants.

Comparison of the haemoglobin levels in the children with M.C.H.C.s of 30-34%—that is, normal values—showed that in each three-months group the West Indians had lower means, and, in most cases, lower

ranges (Fig. 2). This suggested that there was a racial difference between the normal ranges at this age. The lowest means were reached in the 11 to 13 months group, and were 73% (10.8 g./100 ml.) for the Europeans and 62% (9.2 g./100 ml.) for the West Indians.

No ova were found in any of the cellophane swabs or faeces.

Fig. 1.—Comparison of haemoglobin levels in West Indian and European infants.

Fig. 2.—Comparison of haemoglobin levels in West Indian and European infants with M.C.H.C.s of 30-34%.

Anaemia in the eczematous infants was treated with oral iron for 8 to 12 weeks, and a satisfactory response occurred in all cases of both races.

Discussion

Our results show several important differences between the West Indian and European infants. It appears that there may be an intrinsic racial difference between the mean haemoglobin levels of healthy negro and white infants. In our series of infants with normal M.C.H.C.s the difference between the mean haemoglobin levels of the two races rose from 0.7 g./100 ml. in the 5 to 7 months group, to 1.6 g./100 ml. in the 11 to 13 months group; thereafter it decreased to 0.6 g./100 ml. by 20 to 23 months. Munday *et al.* (1938) found a difference between the mean haemoglobin levels of negro and white infants of 0.5 g./100 ml. at 4 months, rising to 1 g./100 ml. at 13 months. Similarly, the mean haemoglobin levels at the age of 1 year in Munday's series were 11 g./100 ml. for the white and 10.5 g./100 ml. for the negro infants, while our values at this age were 10.9 and 9.1 g. respectively. As the nutrition of Munday's infants was carefully supervised, dietary deficiency was an unlikely aetiological factor in his series.

A surprisingly high incidence of iron deficiency was found in the European infants (22.4%), while the incidence of anaemia was very much higher in the West Indian group (53.5%). No simple explanation for this difference in incidence between the two races could be found. There was no evidence to suggest that prematurity, excessive growth, malnutrition, or the presence or absence of eczema was responsible. The failure to find ova in the stools eliminated intestinal worms as a factor, and the satisfactory response to oral iron made severe malabsorption an unlikely cause. The possibility of inadequate diet or deficient iron stores at birth was considered. Although detailed dietary surveys were not carried out there seemed to be little difference between the diets of the two races or in the time at which mixed feeding was started. Furthermore, all the children attending the day nurseries received the same diet for five days of the week. While dietary factors may have played some part in the older children, they are unlikely to have accounted for the differences found in the infants aged 5 to 7 months. In this age-group an M.C.H.C. below 30% was found in five out of seven West Indian infants but in only one out of twelve European infants. Thus, at the end of the first five to seven months of life many more of the West Indian infants were already iron-deficient, and in the preceding period the diet of both races would have consisted almost entirely of milk. Thus it seemed probable that the iron deficiency in this group resulted from diminished iron stores at birth.

Summary

Among infants aged 5 to 23 months the haemoglobin levels and the mean corpuscular haemoglobin concentration were lower in the West Indians than in the Europeans. Atopic eczema did not contribute to this difference, since similar haemoglobin levels were found in the healthy and eczematous infants.

Iron-deficiency anaemia, indicated by an M.C.H.C. of less than 30%, occurred in 22.4% of the European and in 53.5% of the West Indian infants.

Such a striking difference could not be explained by prematurity, excessive growth, malnutrition, or the presence of worms. Furthermore, the satisfactory response to oral iron excluded any obvious absorption defect.

While deficient iron intake may have played a part in the older infants it would not have accounted for the high incidence of iron deficiency in the West Indians aged 5 to 7 months; in these infants diminished iron stores at birth may have been responsible. Even when the M.C.H.C. was normal, haemoglobin levels were lower in the West Indians than in the Europeans. This suggested an inherent racial difference in haemoglobin levels in this age-group.

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INCOMPLETE ANTI-O IN A PREGNANT MOTHER

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Naturally occurring anti-O, complete and bivalent in type, has been demonstrated by many workers (Landsteiner and Witt, 1926; Henry, 1946; Boorman, Dodd, and Gilbey, 1948). Morgan and Watkins (1948) differentiated anti-H from true anti-O by agglutination inhibition technique. Agglutination of group O cells with anti-H was inhibited by saliva of secretors, but that produced with anti-O agglutinin remained unaffected. Bhatia and Bhende (1954) demonstrated that H-agglutininogen was antigenic to rabbits, but completely mutated O antigen failed to produce any antibody. While investigating a woman with a history of stillbirths, an incomplete type of anti-O was detected in her serum towards the later months of pregnancy. The details of the investigations on this patient are presented below. A similar instance of an incomplete type of anti-O was first demonstrated by Mollison (1959) in a group A patient.

Case Report

A woman aged 34 was first examined on October 10, 1958, during the sixth month of pregnancy. She was