

An Investigation into the Variation of the Haemoglobin
Level in Women with Special Reference to
Menstruation and Pregnancy.

THESIS FOR M.D. EXAMINATION
OF THE UNIVERSITY OF GLASGOW

Submitted by

JEAN M. MACKINTOSH, M.B., CH.B., D.P.H.

Assistant Medical Officer for Maternity and Child Welfare,
County Borough of Stockport

ProQuest Number: 13905433

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 13905433

Published by ProQuest LLC (2019). Copyright of the Dissertation is held by the Author.

All rights reserved.

This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

INDEX

	Page
SECTION I. Introduction.	
Description of method and material	1
SECTION II. Comparison of haemoglobin values found in pregnant and non-pregnant women	6
SECTION III. Variation in haemoglobin level before menstruation and during pregnancy	11
SECTION IV. Variation in haemoglobin level over an extended period ...	18
SECTION V. Incidence of anaemia among pregnant women and its influence on the subsequent confinement and survival of the child	31
SECTION VI. Summary and Conclusions	33
APPENDICES	35
BIBLIOGRAPHY	92

AN INVESTIGATION INTO THE VARIATION OF THE HAEMOGLOBIN LEVEL IN WOMEN WITH SPECIAL REFERENCE TO MENSTRUATION AND PREGNANCY.

SECTION I.

The original purpose of this investigation was to find out whether there was any variation in the haemoglobin level before the onset of the menstrual flow (Group A.), and during pregnancy (Group B). In the first part of the investigation 45 unmarried women were examined, and in the second part 486 pregnant women were examined. In Group A. each woman was examined on a number of occasions. In Group B. single readings were taken in the case of 424 women, and two or more readings in the case of 62 women. The total number of observations made in Group A. was 953, and in Group B. was 604. During the course of the investigation various other points of interest emerged, and are dealt with in the text.

Method:

A Haldane's haemoglobinometer, and two pipettes, purchased from Messrs. Hawkesley's, in London, were used. These two pipettes were the only ones used throughout. They were tested subsequent to the investigation at the National Physical Laboratory. They showed a difference in volume at 15°C. of .0005 ml. At 120 per cent. on the Haldane scale, which was the highest reading made, the difference in reading when the two pipettes were used would be 3 per cent. At 68 per cent., which was the lowest reading made, the difference would be 1.75 per cent.

The same blood tube was used throughout the investigation, and in practically all cases the same pipette was used for most of the observations made on the same individual. Blood was taken from the thumb, using the cutting needles supplied with the instrument. Distilled water, as supplied by a manufacturing chemist, was used as a diluent. With ordinary litmus paper this gave a neutral reading.

Opinion is divided as to the accuracy of the Haldane method. It has been used by Lucey (1), Price Jones (2), Helen Mackay (3) and Davidson (4) in their investigations. Price Jones compared the Haldane and Van Slyke methods, and found only 2 per cent. difference. Lucey, using an alkaline diluent, found the method very accurate. Short (5) considered it very accurate with consistent results. Newham, Willshire, and Scharff (6) found it unreliable with an error up to 10 per cent. Senty (7) considers it fairly accurate.

Description of Material:

Group A.

1. The group consisted of 45 unmarried women—36 nurses resident in hospital, 5 health visitors, 1 clerk, and 3 patients in hospital suffering from tuberculosis of the lungs.

Some of the 36 nurses were on day duty, and some on night duty, 20 being changed from day duty to night duty and vice versa during the course of the investigation. Four nurses left hospital soon after the investigation began. In one case the onset of menstruation was so irregular that observations were abandoned. Three nurses became ill, one with debility and anaemia, one with gastritis, and one with rheumatism, and no further observations were made on these patients.

The 5 health visitors and the clerk were working ordinary office hours, 9 to 5-30.

The 3 tubercular patients, although in hospital, were well enough to get up for some hours each day.

With the exception of the 3 tubercular patients, the previous health of all the women was good. Most of them had had their annual holiday before the investigation commenced.

2. The ages ranged from 18-39 years, and the average age was 25 years. The distribution was as follows:—

20 years and under	...	...	...	...	10
21-25 years	...	...	...	...	15
26-30 years	...	...	...	...	11
31-35 years	...	...	...	...	6
36-40 years	...	...	...	...	3

3. The observations were made between the months of July, 1933, and March, 1934. Three sets of readings were taken:—

(a) *Intermenstrual readings:*

These observations were made as nearly as possible midway in each menstrual cycle, i.e. between the day of onset of one menstrual flow and the day of onset of the succeeding menstrual flow.

(b) *Daily readings:*

These readings were taken one daily for a period of six days midway in one menstrual cycle.

(c) *Premenstrual readings:*

It was originally planned to take readings once daily for the three days preceding the onset of the menstrual flow. As, however, the length of the menstrual cycle in each individual varied by not less than 2 days, and in some cases by as many as 12 days—the average variation being 5.5 days—in some cases it was only possible to take one or two readings before the onset of the menstrual flow, while in others observations had to be continued over a week or more before the flow commenced. The group of 100 other observations contains all observations not included in the first three groups, and consists mainly of the additional observations made when the onset of the menstrual flow was irregular.

In 18 of the 45 cases all the observations were made between the hours of 9 and 10 a.m. (Sub-group I). In 27 cases observations were taken at varying times (Sub-group II). A total of 953 observations was made. These are set out in detail in Table I.

TABLE I.
Sub-group I.

Number	Period observed in weeks	Number of Observations					Number	Period observed in weeks	Number of Observations				
		Intermenstrual	Daily	Premenstrual	Others	Total			Intermenstrual	Daily	Premenstrual	Others	Total
5	32	8	6	14	...	27	18	30	8	6	14	1	28
6	32	9	6	13	2	29	19	31	9	6	18	1	33
8	31	8	6	15	1	29	25	32	7	6	9	8	29
9	32	7	6	14	2	28	28	32	9	6	13	...	27
10	3	1	...	2	1	4	30	22	7	6	14	1	27
12	24	6	6	14	...	25	31	8	3	...	5	1	9
13	32	7	6	15	5	32	32	24	7	6	13	...	25
15	30	8	6	16	1	30	37	9	2	...	8	...	10
17	30	7	6	20	6	38	38	22	5	6	12	4	26

TABLE I.
Sub-group II.

Number	Period observed in weeks	Number of Observations					Number	Period observed in weeks	Number of Observations				
		Intermenstrual	Daily	Premenstrual	Others	Total			Intermenstrual	Daily	Premenstrual	Others	Total
1	33	8	5	12	...	24	27	17	5	5	3	3	15
2	33	9	5	13	...	26	29	25	6	5	13	2	25
3	34	9	6	17	...	31	33	23	7	...	13	7	27
4	15	2	...	2	3	7	34	18	5	...	12	2	19
7	31	9	6	16	2	32	35	10	3	...	9	...	12
11	14	5	...	8	...	13	36	13	4	...	12	...	16
14	13	3	...	...	11	14	39	22	4	5	14	1	23
16	30	8	...	13	2	23	40	22	6	6	12	6	30
20	2	...	...	3	3	6	41	22	6	...	10	6	22
21	13	3	...	6	4	13	42	19	5	...	8	8	21
22	31	7	6	13	1	26	43	19	6	...	7	2	15
23	3	2	...	1	1	4	44	18	5	...	11	...	16
24	15	4	...	13	...	17	45	19	5	...	10	2	17
26	11	2	...	1	...	3							

The number of daily observations in each case includes one observation which is also included in the number of intermenstrual observations. The total number of observations, therefore, in each case shown in the last column where daily observations were made, does not correspond with the sum of the preceding four columns, but is one less in each instance.

The largest number of observations made on any one individual was 38, and the smallest number was 3. The average number of observations was 21.18. The average time over which cases were observed was 21.80 weeks. In sub-group I the average period of observation was 25.33 weeks, and in sub-group II it was 19.44 weeks.

Over the whole series the shortest time of observation in any one case was 2 weeks, and the longest time 34 weeks.

Group B.

486 pregnant women were examined in this group. This number includes 62 women who had their blood examined twice or more during pregnancy. In 253 cases the examination was made between 10-30 a.m. and 12 noon, and in 233 cases between 2-30 p.m. and 4 p.m. The observations were carried out between the months of May, 1933, and May, 1934. The total number of observations made was 604.

The age distribution of the patients was as follows:—

17-20 years	...	...	...	...	...	...	48
21-25 years	...	...	...	...	...	...	151
26-30 years	...	...	...	...	...	...	136
31-35 years	...	...	...	...	...	...	93
36-40 years	...	...	...	...	...	...	39
41 years and over	...	...	...	...	...	...	19

The distribution of cases according to parity was as follows:

Primiparae	...	...	...	...	...	...	177
2nd para.	...	...	...	...	...	...	132
3rd para.	...	...	...	...	...	...	62
4th para.	...	...	...	...	...	...	39
5th para.	...	...	...	...	...	...	31
6th para.	...	...	...	...	...	...	14
7th para.	...	...	...	...	...	...	9
8th para.	...	...	...	...	...	...	6
9th para.	...	...	...	...	...	...	5
10th para.	...	...	...	...	...	...	3
11th para.	...	...	...	...	...	...	3
12th para.	...	...	...	...	...	...	4
13th para.	...	...	...	...	...	...	1

The social circumstances are dealt with in detail in the next section.

All the women in this group attended the corporation ante-natal clinics.

SECTION II.

COMPARISON OF HAEMOGLOBIN VALUES FOUND IN PREGNANT AND NON-PREGNANT WOMEN.

It became apparent early in the investigation that there was a marked difference between the haemoglobin level in Group A and the level in Group B.

Group A.

The following averages were found:

	Per cent.	Grms per 100 c.c.
Total readings (953)	97.67	13.48
Intermenstrual readings (256)	97.72	13.49
Daily readings (139)	98.76	13.63
Premenstrual readings (482)	97.63	13.47

All observations from every patient were used in arriving at the average for the total observations. As the number of observations per patient varied from 38 to 3, this figure may be considered unduly weighted. Therefore an average reading for each patient was taken, as shown in column 2 of appendix A., and the mean of these averages taken. The mean thus obtained was 97.17 per cent. or 13.41 grms. per 100 c.c., as compared with 97.67 per cent. or 13.48 grms. per 100 c.c. shown for the total readings in the table above.

Again, owing to the possible influence of menstruation and the fact that the total readings include 482 premenstrual observations, the average of the intermenstrual readings which were taken midway between two menstrual periods may be considered a truer indication of the normal level in these women. As the number of intermenstrual observations varied, the average in each case was again taken, as shown in column 3 of appendix A., and the mean of these averages obtained. This was found to be 97.61 per cent. or 13.47 grms. per 100 c.c. as compared with 97.72, or 13.49 grms. per 100 c.c., as shown in the table above.

A considerable amount of work has now been done on the normal haemoglobin level in women. Using the Van Slyke method, the following results were obtained by the writers indicated:

Country	Author	No. of women	Average Hb. value in grms. per 100 c.c.
U.S.A.	Osgood and Haskins (8) ...	100	13.7
U.S.A.	Wintrobe and Miller (9) ...	50	13.8
Argentina	Orias (10) ...	22	13.4
India	Sokhey (11) ...	101	12.9
England	Jenkins and Don (12) ...	116	13.8

Haldane (13) using his own instrument, examined 12 women, and found an average value of 12.5 grms. By the same method Price Jones (2) examined 100 women students and nurses, and found an average of 13.57 grms. per 100 c.c. Williamson (14), using the spectrophotometer, found the average for the adult female to be 15.53 grms.

The average figure in the present investigation compares closely with that obtained by Price Jones (2) using the same method.

Group B.

A very different picture is presented in this group. The number of individual women examined was 486. A detailed analysis of the age groups is given in Table 2.

TABLE 2.
ANALYSIS OF AGES—GROUP B.

Para.	20 and below	21—25	26—30	31—35	36—40	41 and over	Total
1st	41	84	45	6	1	...	177
2nd	7	54	40	24	6	1	132
3rd	...	10	29	16	2	5	62
4th	...	3	13	16	6	1	39
5th	...	...	6	17	5	3	31
6th	...	...	3	3	6	2	14
7th	...	...	...	4	3	2	9
8th	...	...	...	4	1	1	6
9th	...	...	...	1	3	1	5
10th	...	...	...	2	1	...	3
11th	...	...	...	...	2	1	3
12th	...	...	...	...	3	1	4
13th	...	...	...	...	...	1	1
Totals	48	151	136	93	39	19	486

An analysis of the haemoglobin determinations is given in Table 3.

TABLE 3.

ANALYSIS OF HAEMOGLOBIN DETERMINATIONS—GROUP B.

Para.	85% and over	70—84%	Below 70%	Total
1st	113	56	8	177
2nd	73	48	11	132
3rd	32	26	4	62
4th	26	10	3	39
5th	21	8	2	31
6th	10	3	1	14
7th	2	4	3	9
8th	3	3	...	6
9th	3	1	1	5
10th	1	2	...	3
11th	1	...	2	3
12th	1	3	...	4
13th	1	...	...	1
Totals	287	164	35	486

The average haemoglobin reading was 88.04 per cent. or 12.15 grms. per 100 c.c. When two or more readings were taken in the same woman, the reading taken nearest the 28th week of pregnancy has been used in arriving at this average figure. The average haemoglobin reading found in Group A. was 97.67 per cent. or 13.48 grms. per 100 c.c. This average is 9.63 per cent., or 1.29 grms. higher than that now given for Group B.

This difference may be accounted for in two ways; first by the difference in the social circumstances of the two groups, and second by the anaemia which is believed by some authors to be present in all pregnant women.

Group A. consisted of 45 women who were living under the best possible conditions. This may also be considered to be true of the three tubercular patients who were living in a hospital, receiving the best food, and out in the open-air most of the day.

Group B. on the other hand, contained for the most part working-class women whose surroundings and dietary compared unfavourably with Group A. An analysis of the social conditions in Group B. shows that only 106, or 21.81 per cent. were in receipt of an income of £3 and over; 234, or 48.15 per cent. received £2 to £3, and 146, or 30.04 per cent. were receiving under £2. Many of this last group were unemployed. The detailed figures are given in Table 4.

TABLE 4.

ANALYSIS OF SOCIAL CIRCUMSTANCES—GROUP B.

Para.	Haemoglobin 85% and over			Haemoglobin 70%—84%			Haemoglobin Under 70%		
	Weekly Income			Weekly Income			Weekly Income		
	Under £2	£2-£3	Over £3	Under £2	£2-£3	Over £3	Under £2	£2-£3	Over £3
1st	16	62	35	16	27	13	...	5	3
2nd	22	34	17	22	17	9	4	4	3
3rd	11	14	7	8	13	5	2	2	...
4th	8	14	4	1	6	3	2	1	...
5th	10	9	2	3	2	3	1	1	...
6th	6	4	...	...	2	1	...	1	...
7th	1	1	...	1	2	1	1	2	...
8th	2	1	...	1	2	...	...	...	...
9th	1	2	...	...	1	...	...	1	...
10th	1	...	...	...	2	...	...	...	...
11th	1	...	...	...	...	...	2	...	...
12th	...	1	...	2	1	...	...	...	...
13th	1	...	...	...	...	...	...	...	...
Totals	80	142	65	54	75	35	12	17	6

To make this part of the work complete, an investigation should have been made into a similar group of pregnant women living under social conditions comparable with those in Group A., and a group of non-pregnant women living under conditions comparable with Group B. This was not, however, possible. An investigation on similar lines was made by Davidson (4) and his co-workers in Aberdeen.

They examined 455 women between the ages of 18 and 53, 57 of whom were pregnant or recently delivered. These women were taken at random from patients and friends attending the Aberdeen dispensary, and their social circumstances corresponded fairly closely to those of the women in Group B. in the present investigation. They used the Haldane instrument, and found that 213, or 46.8 per cent. of these women gave readings below 85 per cent. and that out of these 213 women 63, or 13.8 per cent. gave readings below 70.

In the present series of 486, using the same divisions, it is found that 199, or 40.95 per cent. gave readings below 85 per cent. and that of these 199, 35 or 7.20 per cent. gave readings below 70.

These figures are rather better than Davidson's, but the difference may be accounted for by the fact that the women included in the present series, although poor, are in a better class than those included in Davidson's series. In Stockport, unemployment, although rife, has never been quite as widespread as in some other towns in Northern England, so that we find that only 146, or 30.04 per cent. of the 486 women in this group are living in circumstances strictly comparable with those of Davidson's series.

When an analysis is made according to social circumstances, the following results are obtained. Of the 106 women whose income was £3 and over, 41, or 38.68 per cent. gave haemoglobin readings below 85 per cent, of the 234 women whose family income ranged between £2 and £3, 92, or 39.32 per cent., and of the 146 women whose income was under £2, 66, or 45.20 per cent. This last figure (45.20) in the poorest class of women, comes very near to Davidson's figure of 46.80 per cent.

When considering these figures, allowance must be made for the effect of repeated confinements on the haemoglobin level of these women. To eliminate this factor as far as possible, the group of 177 women who were primipara was considered alone. Of these, 51 had an income over £3, 94 an income of £2-£3, and 32 an income of under £2. In the first class 31.37 per cent. were below 85 per cent. haemoglobin, in the second 34.04 per cent. and in the third 50 per cent.

These figures would seem to demonstrate clearly that a low standard of living per se has a definite effect on the haemoglobin level in women.

The question of the incidence of anaemia among pregnant women is dealt with in a later section.

Bland, First and Goldstein (15), using the Dare method, obtained a similar result in pregnant women. In their series 82 per cent. of their dispensary cases had haemoglobin readings of 74 or less. Orias (10), examining men in the Argentine, found that conscripts and working class men gave readings less than officers and students, and registered his opinion that the social state was important.

SECTION III.

VARIATION IN HAEMOGLOBIN LEVEL BEFORE MENSTRUATION AND DURING PREGNANCY.

Menstruation. —Group A.

Numerous investigations have been made into the variation, if any, of the haemoglobin level before, during and after menstruation. Novak (16) reviews the literature and quotes Hayim (17), Reinl (18), Merletti (19) and Ricca Barbaris (20), who found a premenstrual decrease and an intermenstrual increase. He also quotes Sfameni (21), Rozzi (22) and Blumenthal (23) who found a decrease during menstruation, and Polzl (24), who found only slight fluctuations in the proportion of haemoglobin. He concludes that it has not yet been demonstrated that menstruation gives rise to any characteristic alteration in the blood picture.

Gumprich (25) also gives a very thorough resumé of the literature. She herself examined 5 healthy women aged 20-30 years, using the Tallqvist scale. Observations were made 2-4 times during menstruation, and 5-7 times in the intermenstrual period. She concludes that considerable variations in the blood picture occur as much in different individuals as in different menstrual periods in the same individual. She found it was possible to get a reduction before, and a rise during menstruation, and that the opposite was also possible. She adds that above everything it must be emphasised that this does not happen as a wave cycle, as has long been maintained. Rud (26) found that menstruation had no appreciable influence on the variation in the number of red cells.

Detre (27) examined 9 cases and found a premenstrual rise in the four cases where he made more than one premenstrual examination. Carnot and Deflandre (28) found at the beginning of the menstrual flow a rapid fall in the number of red cells, and that the normal count was regained in 8-10 days. Krutchenkoff (29) also found a premenstrual increase.

Reich and Green (30) examined 6 normal women twice weekly over the same period of three months, using a Sahli instrument standardised against a Van Slyke. They found no definite changes coincident with the various phases of menstruation. Piney (31) is not certain about the premenstrual rise. Davidovitsch (32), quoted by Reich and Green (30), found variations in the cell count during menstruation which were not definite.

In the present enquiry, of the 45 persons in Group A., twenty-five were examined at least twice during four premenstrual periods, 7 were examined during three premenstrual periods, and 4 were examined during two premenstrual periods. The remaining 9 were either examined during one premenstrual period only, or no premenstrual observations were made.

For the purpose of this part of the enquiry, the data obtained from the first 32 will be considered. These women were examined at least twice during each of three or four premenstrual periods.

Of the 32, 26 were nurses in hospital, 2 suffered from tuberculosis of the lungs, 3 were health visitors, and one was a clerk. The age distribution was as follows:

18-20 years	...	...	6	31-35 years	...	...	4
21-25 years	...	...	11	36-40 years	...	...	2
26-30 years	...	...	9				

Of these, 15 were in Sub-group I, and had all the readings taken between 9 and 10 a.m., and 17 were in Sub-group II, and had the readings taken at various times.

The length of the menstrual cycle in each individual showed considerable variation, both when one individual was compared with another, and also when three or four menstrual cycles were compared in the same individual.

The variation in each individual is shown in the following table:

Amonnt of Variation.	No. of Cases	Amount of Variation	No. of Cases
2 days	5	8 days	1
3 days	7	9 days	3
4 days	3	10 days	1
5 days	5	11 days	1
6 days	2	12 days	1
7 days	3		

The age of onset of the menstrual flow was as follows.

10 years	...	...	1	15 years	...	...	4
12 years	...	...	2	16 years	...	...	5
13 years	...	...	9	17 years	...	...	1
14 years	...	...	9	18 years	...	...	1

TABLE 5.

HAEMOGLOBIN DETERMINATIONS.

Sub-Group I.

Number	1st Premenstrual Period					2nd Premenstrual Period					3rd Premenstrual Period					4th Premenstrual Period					
	1st day	2nd day	3rd day	4th day	5th day	1st day	2nd day	3rd day	4th day	5th day	1st day	2nd day	3rd day	4th day	5th day	1st day	2nd day	3rd day	4th day	5th day	
5	92	98	100	...	...	102	...	108	106	...	88	90	96	...	...	96	96	104	98	98	
8	94	102	102	...	...	96	...	91	102	100	94	...	96	100	96	96	...	94	92	...	...
9	90	92	86	...	...	...	94	94	104	88	86	86	88	...	...	78	78	...	78	76	...
12	100	96	...	...	...	102	104	104	...	...	96	96	102	96	...	98	92	92	92	...	...
13	102	110	...	...	...	104	...	108	114	120	100	100	...	104	104	98	98	90	...	98	...
15	98	102	94	...	...	94	98	100	92	...	94	94	98	...	94	...	100	98	102	104	...
17	...	104	100	108	102	102	96	108	108	106	96	90	98	...	100	92	100	...	100	...	...
18	104	102	...	94	102	84	92	...	92	98	102	88	88	...	...	98	92	...	...	...	...
19	94	...	102	98	102	94	90	86	84	94	94	92	...	90	88	...	92	90	100	92	...
28	106	102	98	...	...	92	...	102	90	...	94	96	94	...	...	98	96	102	88	...	...
30	100	...	104	98	...	106	90	94	106	104	102	94	...	108	...	100	...	...	106	102	...
32	100	106	112	...	...	100	112	98	102	100	100	102	98	...	...	106	94	...	...	...	...
38	...	94	94	102	96	104	100	...	...	...	100	106	102	...	...	106	102	102	...	...	...
6	110	108	112	120	...	100	106	...	...	...	116	110	...	118	108	...	...	...	...	...	...
37	100	94	94	...	...	100	100	98	...	...	...	104	...	104	...	...	...	...	...	...	...

TABLE 5.

HAEMOGLOBIN DETERMINATIONS.

Sub-Group II.

Number	1st Premenstrual Period					2nd Premenstrual Period					3rd Premenstrual Period					4th Premenstrual Period				
	1st day	2nd day	3rd day	4th day	5th day	1st day	2nd day	3rd day	4th day	5th day	1st day	2nd day	3rd day	4th day	5th day	1st day	2nd day	3rd day	4th day	5th day
1	116	112	104	...	...	104	112	...	...	...	106	108	...	98	...	96	100	102	...	108
2	94	100	...	...	...	90	82	92	86	84	90	88	92	...	...	94	80	...	...	...
3	...	98	100	104	...	104	106	102	100	104	96	...	104	90	...	92	92	...	...	...
7	100	...	102	96	...	100	92	98	...	...	102	...	96	96	86	102	98	102	100	100
16	98	98	...	...	...	104	106	98	...	...	102	100	104	100	...	90	98	...	...	...
22	92	86	...	...	...	90	94	...	92	...	94	96	96	98	...	102	...	92	104	...
24	102	...	98	...	...	108	100	102	110	102	106	...	100	98	...	110	...	102	106	...
29	92	102	...	102	...	94	98	...	88	90	100	90	...	...	102	98	...	...	96	100
33	92	90	94	94	...	98	90	...	...	...	96	98	102	98	...	102	100	...	...	...
34	...	102	100	102	...	...	94	...	96	104	96	92	96	100	...	98	94	...	...	...
39	102	104	110	...	...	88	102	96	104	92	...	92	96	108	106	98	98	...	...	...
40	94	90	96	...	...	102	...	104	...	...	...	100	104	98	100	108	94	...	100	...
41	104	104	112	108	...	112	...	120	...	...	112	104	...	...	...	...	...	...	...	...
36	96	94	100	106	108	94	88	96	96	...	100	94	98	...	...	...	...	...	...	...
41	102	...	94	...	...	114	106	110	...	...	116	108	106	114	...	...	...	...	...	...
44	90	82	...	...	...	86	...	90	...	...	...	92	92	90	...	...	...	...	...	...
45	74	84	84	...	86	82	82	...	...	...	74	80	68	...	...	...	...	...	...	...

Note—The first day denotes the day before the onset of the menstrual flow. The Second day denotes the second day before the onset, and so on.

The average duration of the menstrual flow was as follows:

2 days	...	...	...	...	...	2
3-6 days	...	...	...	...	...	28
8-10 days	...	...	...	...	...	2

Dysmenorrhoea of a greater or lesser degree was complained of in 11 cases, but only in 2 cases was it at all severe.

The readings obtained over the periods studied are set out in Table 5. From that Table it will be seen that, with the possible exception of Cases Nos. 5 and 13 in Sub-group I, which show a more or less consistent premenstrual fall, no definite trend can be traced in any group of observations.

If the mean intermenstrual reading for each individual case is compared with the mean total premenstrual reading for the same case, it is found that it is greater in 14 cases (6 in Sub-group I and 8 in Sub-group II), less in 14 cases (7 in Sub-group I and 7 in Sub-group II), and the same in 4 cases (2 in Sub-group I and 2 in Sub-group II).

If the mean for the 1st premenstrual day is compared with the mean for the 2nd premenstrual day in each individual case, it is found that the mean for the 1st day exceeds that for the 2nd in 15 cases (5 in Sub-group I and 10 in Sub-group II), is less in 14 cases (8 in Sub-group I and 6 in Sub-group II), and the same in 3 cases (2 in Sub-group I, and 1 in Sub-group II).

Similar inconclusive results were obtained when the means for the 2nd to the 5th days were compared. Neither could any parallel be drawn between the variation in the length of the menstrual cycle and the rise and fall of the haemoglobin level in the premenstrual period.

Pregnancy—Group B.

Numerous observations have been made on the variation in the haemoglobin level in pregnancy. Thompson (33) examined 12 cases by the Gower method, and found a low haemoglobin percentage throughout the first seven months, but that it rapidly approached normal as pregnancy drew to a close. Friedlander and Widemeyer (34) in 12 patients found the reticulocyte count increased during pregnancy.

Kehrer (35) concludes that the content of haemoglobin in pregnancy is near the upper limits of normal, and that especially during the last month there is an additional increase due to increased work of haematopoetic organs, increased intake of food, and less exercise during pregnancy.

DeLee (36) states that the blood reacts differently under stimulus of pregnancy in different women.

Fehling (37) made 100 examinations, and found very little change.

Williamson (38) quotes work of Harris, and considers that the blood volume is definitely increased, but that the cell and haemoglobin content is relatively, but not actually, diminished.

Kühnel (39) examined 15 women, using a Sahli instrument, and found minimum figures from the 16th to 22nd week. He found this low figure was maintained until the 30th-32nd week, when there was a gradual rise to the maximum at 34 weeks. The normal level, however, was never reached. He believes in the existence of a physiological anaemia of pregnancy.

Dieckmann and Wegner (40) review the literature and state that all observations, with the exception of those of Fehling (37) and Kühnel (39) were made on different groups, and because of wide variations found normally, their data are inconclusive. They state that the marked variations are due to the changes in the blood and plasma volumes. They estimated the haemoglobin, hemocrit and erythrocyte values and blood volume in various groups of women throughout pregnancy and the puerperium. They found that there is a definite decrease in the haemoglobin per 100 c.c. of blood. They consider that the maximum decrease, amounting to 15 per cent. is from the 26th to the 35th week, that there is a slight but definite decrease in the haemoglobin per kilogram during pregnancy, and that the total amount of haemoglobin shows an average increase of 13 per cent. but individual cases show a marked gain during pregnancy.

In the present series 62 women were examined more than once during pregnancy. All examinations were made between 10-30 a.m. and 12 noon. Not less than 4 weeks separated each observation. The age distribution was as follows:

20 years and under ...	7	31-35 years	10
21-25 years	16	36-40 years	2
26-30 years	25	40 years and over ...	2

The parity distribution was as follows:

1st	24	5th	4
2nd	18	6th	2
3rd	6	8th	2
4th	5	12th	1

The observations were carried out between the months of May, 1933, and March, 1934. The total number of observations made was 180. They were distributed as follows:

6 observations in 2 cases.

5	„	4	„
4	„	8	„
3	„	20	„
2	„	28	„

The detailed readings are set out in Appendix F. Two or more observations were made before the 32nd week in 31 cases. In 10 cases the values remained more or less stationary, the variation being at no time greater than 6 per cent. In 1 case

there was a fall and then a rise, and in 2 cases a rise and fall of more than 6 per cent. In 7 cases there was a fall of more than 6 per cent., and in 11 cases a rise of more than 6 per cent.

In 46 cases, 2 or more observations were made after the 32nd week. Of these 26 were stationary or showed a variation of less than 6 per cent., 1 showed a fall and rise, 10 showed a rise of more than 6 per cent. and 9 a fall of more than 6 per cent.

It was considered possible that the incidence of abnormality in pregnancy, other than anaemia or the degree of anaemia itself might have some bearing on the rise and fall of the haemoglobin readings. When abnormality in pregnancy is considered in the group of 31 cases observed before the 32nd week, of the 11 cases which showed a rise, 2 (18.18 per cent.) had an abnormal pregnancy; of the 7 cases which showed a fall, 3 (42.86 per cent.) had an abnormal pregnancy, and among the stationary group of 10, 4 (40 per cent.) had an abnormality during pregnancy.

If, on the other hand, the group of 46 observed after 32 weeks is considered, it is found that 2 (20 per cent) of the 10 cases which showed a rise had an abnormal pregnancy; 2 (22.22 per cent.) of the 9 cases which showed a fall had an abnormal pregnancy, and 3 (11.54 per cent.) of the 26 who were more or less stationary had some abnormality during pregnancy. These results are inconclusive, and abnormality during pregnancy would not appear to have much bearing on the rise or fall of the haemoglobin readings.

When the degree of anaemia is considered in the group of observations before 32 weeks, 4 (36.36 per cent.) of the 11 cases which showed a rise were below 85 per cent. of haemoglobin; 6 (85.71 per cent.) of the 7 cases which showed a fall, and 7 (70 per cent.) of the 10 cases which were stationary, were also below that level.

In the group of observations after 32 weeks, 8 (80 per cent.) of the 10 cases which rose were below 85 per cent.; 5 (55.55 per cent.) of the 9 cases which fell, and 16 (61.5 per cent.) of the 26 stationary cases, were below that level.

The degree of anaemia does not appear to influence the rise or fall of the haemoglobin level.

As a result of the examination of this series of pregnant women by the Haldane method, no definite trend in the rise or fall of the haemoglobin readings was found.

SECTION IV.

VARIATION IN THE HAEMOGLOBIN LEVEL OVER AN EXTENDED PERIOD.

In the literature there is little regarding the variation in the haemoglobin level in one individual from day to day, and over longer periods of time. Reich and Green (30), in the United States, using a Sahli haemoglobinometer, after standardisation against the Van Slyke oxygen combining method, examined 6 normal women twice weekly over the same period of three months (20th January to 24th April). They found maximum variations in the readings of 22: 15: 20: 19: 19 and 17.

Smith (41), using a Duboscq instrument, found real differences between the haemoglobin determinations of separate days, or between averages for longer periods. She found that the variation in the haemoglobin level described a regular pattern in each individual, with a tendency to depression each 10 or 15 days, and that the menstrual period had a definite position in the curve.

The time of the day at which the observations were taken is not stated in the case of Reich and Green (30). Smith (41) made her observations at various times throughout the day. Rud (26) found no real variations in the number of red blood cells in the course of the day. He examined various patients at intervals over a period of six months, and found real variations uncommon and unimportant.

Diurnal variations have been noted by a number of writers. Ward (42) found a variation of about 5 per cent. Dreyer, Bazett and Pierce (43), using a Duboscq colorimeter, consider that variations of 10 per cent. are common, and that they may even reach 30 per cent. They considered that on an average, excursion seemed to be more marked in individuals with a low haemoglobin content of the blood, and that the variations are less in the late afternoon.

Mills (44) examined 16 cases two hourly from 8 a.m. to 6 p.m., using the Dare instrument corrected by Van Slyke. He found the largest variation to be 11.2 per cent., and the average 5.1 per cent. Included in his series were ten cases of pernicious anaemia, and he concludes that the hourly variations in the percentage of haemoglobin in the blood which have been shown to occur in normal persons, do take place in anaemia, but to a less extent.

Rabinovitch (45), using the Van Slyke method, examined 20 persons, and found an average variation of 12 per cent. Newham, Willshire and Scharff (6), again using the Van Slyke method, examined 6 soldiers, and found a maximum variation of 14 per cent. Two out of their 6 cases showed a digestive rise at 2 p.m. Schwinge (46) found a 5 per cent. variation between 8 a.m. and 8 p.m. Smith (41)

found that the haemoglobin determinations varied within the limits of error for short periods of time. Doan and Zerfas (47) and Ponds and Millar (48) considered that the haemoglobin followed the curve of the red cells. In another communication Doan and Sabin (49) consider that the increase of haemoglobin may precede that of the red cells. Oliver (50) found a digestive rise at its maximum an hour after meals. He found that the rise was rapid, and the subsidence gradual. Short (5) examined three normal persons over several days, and found the haemoglobin higher in the afternoon than in the morning. Leichtenstern (51) found the highest readings at 12 noon, and the lowest at 4 p.m.

Group A.

For the purpose of assessing results in the present enquiry, it has been considered convenient, as before, to divide the 45 cases in Group A into two sub-groups, Sub-group I consisting of the 18 cases in which all the observations were made between 9 a.m. and 10 a.m., and Sub-group II consisting of the 27 cases where the readings were taken at various times. Sub-group II contains the three tubercular patients, and the three nurses who went on sick leave.

All cases showed variation in the haemoglobin level, and some cases showed considerable variation. The maximum variation in each individual case is set out in Table 6.

TABLE 6.
TOTAL VARIATIONS—GROUP A.
Sub-Group I.

Number	Period observed in weeks	Total No. of readings	Maximum variation	Number	Period observed in weeks	Total No. of readings	Maximum variation
5	32	27	20	18	30	28	22
6	32	29	20	19	31	33	26
8	31	29	16	25	32	29	30
9	32	28	28	28	32	27	18
10	3	4	4	30	22	27	18
12	24	25	24	31	8	9	14
13	32	32	30	32	24	25	20
15	30	30	22	37	9	10	12
17	30	38	30	38	22	26	16

TOTAL VARIATIONS—GROUP A.
Sub-Group II.

Number	Period observed in weeks	Total No. of readings	Maximum variation	Number	Period observed in weeks	Total No. of readings	Maximum variation
I	33	24	20	27	17	15	24
2	33	26	20	29	25	25	16
3	34	31	26	33	23	27	14
4	15	7	14	34	18	19	14
7	31	32	22	35	10	12	20
11	14	13	18	36	13	16	22
14	13	14	12	39	22	23	26
16	30	23	22	40	22	30	26
20	2	6	16	41	22	22	18
21	13	13	24	42	19	21	20
22	31	26	24	43	19	15	20
23	3	4	14	44	18	16	18
24	15	17	14	45	19	17	18
26	11	3	24				

From that it will be seen that the maximum variation ranges from 30 to 4, the average being 19.91. The average maximum variation for the 7 cases with an average reading under 90 per cent. was 22.0. The average maximum variation for the 3 tubercular patients was 20.0.

If Sub-groups I and II are considered separately, it is found that the maximum variation ranges in Sub-group I from 30 to 4, and in Sub-group II from 26 to 12. The average maximum variation in Sub-group I is 20.56, and in Sub-group II is 19.48. The average period of observation for the whole series was 21.80 weeks; in Sub-group I it was 25.33 weeks, and in Sub-group II it was 19.44 weeks.

As the number of observations from each group contributing to the total varied from 482 premenstrual observations to 139 daily observations, it was considered desirable to examine each group separately.

Intermenstrual observations were made in 44 cases. In one of these cases only one intermenstrual observation was made, leaving 43 cases in which two or more observations were made. The average interval between each observation was 30.88 days, and the average day in the menstrual cycle in which the observations were taken was the 15th day following the onset of the menstrual flow. The largest number of intermenstrual observations made on one individual was 9, and the smallest was 2, i.e. excluding the case mentioned above where only one intermenstrual observation was made. The average number of observations was 5.95. The maximum variation in each case is shown in Table 7.

TABLE 7.
INTERMENSTRUAL VARIATIONS—GROUP A.
Sub-Group I.

Number	Period observed in weeks	Total Number of observations	Average interval between each observation	Average day in Menstrual Cycle when observations made	Maximum variation whole period	Largest variation from one observation to next	Number	Period observed in weeks	Total Number of observations	Average interval between each observation	Average day in Menstrual Cycle when observations made	Maximum variation whole period	Largest variation from one observation to next
5	30	8	30	16	16	10	18	28	8	28	14	18	18
6	32	9	28	14	6	6	19	31	9	27	15	24	16
8	31	8	31	15	12	8	25	32	7	38	15	20	20
9	32	7	38	16	8	4	28	32	9	28	15.5	12	12
10	3	1	...	...	...	...	30	22	7	25	14	6	6
12	22	6	29	15	20	20	31	8	3	28	15	14	14
13	30	7	35	15	8	8	32	24	7	27	16	16	6
15	30	8	29	13.5	22	20	35	4	2	29	15	0	0
17	30	7	35	15.5	24	24	38	18	5	31	16	10	6

INTERMENSTRUAL VARIATIONS—GROUP A.
Sub-Group II.

Number	Period observed in weeks	Total Number of observations	Average interval between each observation	Average day in Menstrual Cycle when observations made	Maximum variation whole period	Largest variations from one observation to next	Number	Period observed in weeks	Total Number of observations	Average interval between each observation	Average day in Menstrual Cycle when observations made	Maximum variation whole period	Largest variation from one observation to next
1	33	8	30	16	16	14	27	15	5	26	15	18	8
2	33	9	29	14	16	14	29	25	6	35	15	14	14
3	34	9	30	16	26	20	33	23	7	27	14	12	12
4	7	2	50	19	6	6	34	16	5	28	15	14	10
7	31	9	27	14	12	10	35	8	3	28	15	10	10
11	14	5	24	16	12	8	36	10	4	25	15	10	10
14	13	3	41	15	6	4	39	20	4	46	15	10	6
16	28	8	27	15	14	10	40	22	6	32	15	26	14
20	...	...	...	...	...	...	41	22	6	31	15	14	12
21	8	3	27	15	10	10	42	15	5	26	15	8	8
22	25	7	29	16	18	8	43	17	6	25	15	20	20
23	3	2	25	16	10	10	44	16	5	28	14	10	10
24	13	4	29	15	14	8	45	16	5	29	15	12	12
26	9	2	58	15.5	6	6							

Note—The day on which the menstrual flow began is counted as the first day of the menstrual cycle.

The largest variation was 26, and the smallest 0. The average maximum variation is 13.49. This is considerably less than the figure 19.91 found for the total observations, although readings were taken over practically the same period of time. It must be remembered, however, that there were 953 total observations, and only 256 intermenstrual observations. The average maximum variation for those cases with a mean haemoglobin reading below 90 was 12.67. The average maximum variation for the tubercular patients was 10.67.

If Sub-groups I and II are considered separately, the average maximum variation for Sub-group I is found to be 13.88, as compared with 20.56, and for Sub-group II to be 13.23 as compared with 19.48. If each individual case is considered separately it is found that the maximum intermenstrual variation is less than the maximum variation in 36 cases (15 in Sub-group I and 21 in Sub-group II), and the same in 7 cases (2 in Sub-group I and 5 in Sub-group II).

If, instead of considering the maximum variation over the whole period, the maximum variation between one intermenstrual reading and the next be taken, the average maximum variation is found to be much less. The figures are set out in the last column of Table 7. From that it will be seen that the maximum variation ranged from 24 to 0, and that the average was 11.21. The average variation for Sub-group I was 11.65, and for Sub-group II was 10.92. The average variation for those cases with a mean haemoglobin reading below 90 was 11.67 and for the three tubercular patients it was 10.67.

These figures are less than those of the total intermenstrual observations. When each case is examined separately it is found that 20 (7 in Sub-group I and 13 in Sub-group II) showed a maximum variation less than that of the intermenstrual observations over a period, and that 23 (10 in Sub-group I and 13 in Sub-group II) showed the same maximum variation.

Daily observations were made in 24 cases during the intermenstrual period. All the observations were made at the same time of day in 19 cases for six consecutive days, in 1 case on five consecutive days, and in 4 cases one day was omitted in mid-week, five observations being made. All observations in each case were made with the same pipette. The maximum variations found are set out in Table 8. All the observations were made in the first three months of the year.

TABLE 8.

DAILY VARIATIONS—GROUP A.

Sub-group I.

Number	Days in Menstrual Cycle when examined	Number of observations	Maximum variation	Number	Days in Menstrual Cycle when examined	Number of observations	Maximum variation
5	18-23	6	12	18	11-16	6	16
6	14-19	6	8	19	15-20	6	10
8	14-19	6	4	25	15-20	6	14
9	16-21	6	8	28	16-21	6	8
12	17-22	6	10	30	14-19	6	6
13	14-19	6	6	32	18-23	6	8
15	15-20	6	12	38	12-17	6	12
17	12-17	6	6				

Sub-group II.

Number	Days in Menstrual Cycle when examined	Number of observations	Maximum variation	Number	Days in Menstrual Cycle when examined	Number of observations	Maximum variation
1	17-22	5	16	27	16-21	5	16
2	14-19	5	2	29	14-19	5	8
3	12-17	6	16	39	13-17	5	8
7	10-15	6	6	40	10-15	5	16
22	14-19	6	12				

The largest variation in any one case was 16, and the smallest 2. The average maximum variation was 10.0. This is lower than the average for the total observations and for intermenstrual observations over the whole period. It is only slightly less than the average maximum variation between one intermenstrual period and the next. The average maximum variation for Sub-group I was 9.33, and for Sub-group II was 11.11. The 3 cases with a mean haemoglobin reading below 90 which were examined daily had an average variation of 8.0. The tubercular patients were not examined for daily variation.

When individual cases are considered, it is found that in all cases the maximum variation was less than that for the total observations. Compared with the intermenstrual variations over a long period, it is found that the maximum daily variation is more than the intermenstrual variation over the whole period in 2 cases, the same in 3 cases, and less in 19 cases. Compared with the intermenstrual variation from one period to the next, it is more in 9 cases, the same in 1, and less in 14 cases.

Premenstrual observations were made in 44 cases. In the other case the menstrual periods were so irregular that the attempt to take premenstrual observations was given up. In 2 cases only one reading was taken, and no comparison was therefore possible. In 1 case two readings were taken, which were identical. The maximum variation in each case for the premenstrual readings is set out in Table 9. All readings up to five days before the onset of the menstrual flow are included.

TABLE 9.
PREMENSTRUAL VARIATIONS—GROUP A.
Sub-group I.

Number	Period observed in weeks	Total Number of readings	Maximum variation whole period	Maximum variation within period	Maximum variation one period to next
5	17	14	20	8	20
6	17	13	20	12	18
8	15	15	14	8	12
9	14	15	28	16	18
10	2/7	2	4	4	...
12	21	14	16	6	16
13	15	15	30	16	20
15	20	16	12	8	10
17	22	20	18	12	18
18	21	14	20	14	20
19	25	18	20	10	18
25	19	9	26	4	26
28	11	13	18	14	16
30	13	14	18	16	18
31	5/7	5	12	12	...
32	16	13	18	14	14
37	9	8	10	6	6
38	16	12	12	8	10

TABLE 9.
PREMENSTRUAL VARIATIONS—GROUP A.

Sub-group II.

Number	Period observed in weeks	Total Number of readings	Maximum variation whole period	Maximum variation within period	Maximum variation one period to next
I	12	12	20	12	14
2	18	13	20	14	20
3	19	17	16	14	14
4	...	2	0	...	0
7	18	16	16	16	16
11	8	8	16	8	16
14	...	...	...	...	...
16	24	13	16	8	12
20	5/7	3	18	18	...
21	12	6	12	4	12
22	24	13	18	12	10
23	...	1	...	...	...
24	13	13	12	10	12
26	...	1	...	...	...
27	4	3	4	2	4
29	17	13	14	10	14
33	18	13	12	8	12
34	16	12	12	10	12
35	8	9	10	10	10
36	11	12	20	14	20
39	12	14	22	16	22
40	18	13	18	14	14
41	18	10	22	10	20
42	14	8	18	12	18
43	17	7	14	12	12
44	16	11	18	16	16
45	13	10	18	12	14

The maximum variations for the whole period ranged from 30 to 2, and the average variation was 16.24 (17.55 for Sub-group I, and 15.25 for Sub-group II). If the variation over each premenstrual period of five days is considered, the average maximum variation is found to be 10.98 (10.44 for Sub-group I and 11.39 for Sub-group II). If the variation between one premenstrual period and the next is considered, the average maximum variation is found to be 14.72 (16.25 for Sub-group I, and 13.65 for Sub-group II).

When individual cases are compared it is found that the variation within the period (5 days) is less than the total premenstrual variation in 36 cases and the same in 5, and that it is less than the maximum variation from one period to the next in 29 cases, and the same in 9 cases. Again, when the 4th and 6th columns of Table 9 are compared, it is found that the maximum variation from one period to the next is less in 19 cases and the same in 19 cases.

When the daily observations in the intermenstrual period are compared with the daily observations in the five days before the onset of the menstrual flow, it is found that the average maximum variation is practically the same in each case, as shown below.

Intermenstrual daily observations	...	10.0
(Sub-group I, 9.33. Sub-group II, 11.01)		
Premenstrual daily observations	...	10.98
(Sub-group I, 10.44. Sub-group II, 11.39)		

The imminence of the onset of the menstrual flow, therefore, would not appear to influence the amount of daily variation in the haemoglobin level. When the readings for the premenstrual period are considered in days, the readings for the first day before the onset of the menstrual flow show an average maximum variation of 10.05 (10.0 Sub-group I, 10.1 Sub-group II). The readings for the second day show an average maximum variation of 8.90 (10.0 Sub-group I, 8.1 Sub-group II); for the third day an average of 9.125 (11.1 Sub-group I, 7.6 Sub-group II.); for the fourth day 8.23 (9.1 Sub-group I, 7.4 Sub-group II), and for the fifth day 8.625 (8.4 Sub-group I, 9.0 Sub-group II). These figures correspond with the intermenstrual variation (11.21), where there was also an interval between the readings of about four weeks. This would again appear to support the contention that the onset of the menstrual flow has no influence on the variation in the haemoglobin level. The figure (16.63) for the average maximum variation for all the premenstrual observations is not strictly comparable, as a much greater number of observations are included.

It is interesting to note that the average variation in Sub-group I is greater than the average in Sub-group II, except in the daily variations in the intermenstrual and premenstrual period, and in the average variation for the 5th day of the premenstrual period. For the first day of the premenstrual period they are practically the same. This is shown in the sub-joined table. This agrees with the view of Dreyer, Bazett and Pierce (43) that the greatest variations are to be found early in the day, and the smallest in the late afternoon.

	Whole Series	Group I.	Group II.
Total variation	19.91	20.56	19.48
Intermenstrual variation—Whole period	13.49	13.88	13.23
Intermenstrual variation—One period to next	11.21	11.65	10.92
Daily variation	10.0	9.33	11.11
Premenstrual variation—Whole period	16.24	17.55	15.25
Premenstrual variation—Within period	10.98	10.44	11.39
Premenstrual variation—One period to next	14.72	16.25	13.65

Premenstrual variations by days:—

	Whole Series	Group I.	Group II.
1st day	10.05	10.0	10.1
2nd day	8.90	10.0	8.1
3rd day	9.125	11.1	7.6
4th day	8.23	9.1	7.4
5th day	8.625	8.4	9.0

The 3 tubercular patients showed a mean variation similar to the whole series, except in the intermenstrual observations, where the variation was less. Friedlander and Widemeyer (34) found no marked abnormality in the reticulocyte count in tubercular patients.

The average maximum variation, however, for the 7 patients with a mean reading below 90, was higher in each group. This gives support to the contention of Dreyer, Bazett and Pierce (43) that the excursion is more marked in individuals with a low haemoglobin content of the blood.

	Whole Series	Tubercular Patients	Anaemic Patients
Total variation.	19.91	20.0	22.0
Intermenstrual variation—Whole period	13.49	10.67	12.67
Intermenstrual variation—One period to next	11.21	10.67	11.67
Daily variation	10.0	...	8.0
Premenstrual variation—Whole period	16.24	16.0	20.0
Premenstrual variation—Within period	10.98	10.6	12.0
Premenstrual variation—One period to next	15.16	14.0	17.67

Group B.

The variations in the haemoglobin readings in this group are set out in the table below:—

Number	Number of observations	Total variation	Number	Number of observations	Total variation
1	16	5	32	2	2
2	2	2	33	20	3
3	14	3	34	16	2
4	16	4	35	12	6
5	14	3	36	14	3
6	12	2	37	14	4
7	22	2	38	16	5
8	26	5	39	8	2
9	4	2	40	6	2
10	12	4	41	4	3
11	6	2	42	0	2
12	14	3	43	4	3
13	16	2	44	8	5
14	22	4	45	2	2
15	18	3	46	10	2
16	14	3	47	0	2
17	4	2	48	2	3
18	16	4	49	4	3
19	10	3	50	8	3
20	8	2	51	16	3
21	20	4	52	0	2
22	6	3	53	6	2
23	22	6	54	14	3
24	0	2	55	6	2
25	12	2	56	4	3
26	16	3	57	0	2
27	14	4	58	2	2
28	16	3	59	8	2
29	2	2	60	6	2
30	4	3	61	8	2
31	6	3	62	20	2

These patients again showed considerable variation in the haemoglobin readings. The maximum variation showed a range between 26 and 0. The average variation was 10.

When the series is considered as a whole (45 women in Group A and 62 women in Group B) the average maximum variation over an extended period as measured by the Haldane scale does not appear to be materially different from that obtained from daily readings over a short period.

The seasonal variation, the difference between morning and afternoon readings and the effect of work was then studied.

Seasonal Variation.

Various authors have considered there was a seasonal change in the haemoglobin level. Lippencott (52) analysed a series of 1,861 determinations in a similar number of women over a period of six years. He used the Tallqvist scale, corrected by Newcomer, and excluded all values below 60. He determined the average of the total by season and by months, and he concluded that the normal average haemoglobin is lower in the Mississippi area than is usually accepted; that the average for women with the Newcomer method is 81 per cent, and that the haemoglobin readings are highest in the cold months of the year, and lowest at the end of the hot period. Chamberlain (53), on the other hand, found no seasonal change. Malassez (54) found more red cells in winter than in summer. Levine (55) concludes that the red cell and reticulocyte count vary with the season, being highest in the spring, and lowest in the winter, the season with the least available ultra violet light.

Friedlander and Widemeyer (34) examined 16 patients, and found a definite increase in the reticulocyte count in spring as compared with winter. Sanford (68) quotes Platt and Freeman, who examined 29 young children, and found a peak in summer, and that the values for February were lower than those for November.

There is also considerable discussion in the literature as to whether the pallid appearance of people long resident in warm climates is due to the climate alone, or some underlying condition. Pons (61) examined 180 patients in Porto Rico and found the average red cell count and the haemoglobin to be considerably higher than that reported in the literature for Porto Rico. This was confirmed by a further analysis of 96 cases admitted to the private wards. He concludes that an underlying cause can always be found for tropical anaemia. Torgesson (59) considers that the red cell count in the tropics is in the region of 3,500,000, and Suarez (60) considers 75 per cent. as the normal average for haemoglobin. Lippencott (52) considered that the average was lower in the Mississippi than further north. Wintrobe (9) considered that accurate blood determinations in the south, compared with similar determinations in other parts of the world, showed a somewhat higher red cell count, with haemoglobin content practically the same as elsewhere. He did not find any evidence of a physiological anaemia. Chamberlain (53) found the red cells normal or slightly lower in the Phillipines. Balfour (58) concludes that climate alone does not produce a change in the blood.

In view of the wide variations normally present among women, it was considered desirable in the present series to consider only the intermenstrual observations as set out in Appendix B.

If the average value for each month is considered, the following values are obtained:

Month	Sub-Group I.		Sub-Group II.		Total	
	Number of Cases	Average Hb. Value	Number of Cases	Average Hb. Value	Number of Cases	Average Hb. Value
July	1	106	4	91.0	5	94.0
August	13	98.30	7	100.14	20	98.95
September	9	102.22	6	100.67	15	101.60
October	14	98.0	14	98.07	28	98.03
November	17	93.35	19	97.32	36	95.44
December	16	95.63	22	98.23	38	97.13
January	15	95.13	19	94.95	34	95.03
February	13	98.0	18	99.33	31	98.77
March	14	97.14	20	102.30	34	100.18

A steady rise in the average haemoglobin value until September can be traced. Thereafter a fall more or less continued until January, when the average begins to rise again. This is the opposite to the result obtained by Lippencott.

Comparison Between Morning and Afternoon Readings.

Of the 27 cases in Sub-group I, of Group A., where the readings were taken at various times of the day, 19 cases had their readings sufficiently distributed between morning and afternoon to make comparison possible. It was found that in 8 cases the average of the morning readings was lower than in the afternoon, and in 11 cases it was higher. These figures are inconclusive, and do not confirm Short's (5) finding that afternoon readings are higher than morning readings.

Effect of Work.

An enquiry was made into the effect of day and night duty on the haemoglobin level. It was found in the 18 cases in which the figures were comparable, that 7 showed a higher average for the readings taken when they were on night duty, 10 showed a lower average, and 1 was approximately the same.

Variation in duty did not therefore appear to have much influence on the average haemoglobin reading.

SECTION V.

INCIDENCE OF ANAEMIA AMONG PREGNANT WOMEN AND ITS INFLUENCE ON THE SUBSEQUENT CONFINEMENT AND SURVIVAL OF THE CHILD.

Adair (63) examining 1,176 new patients at the Chicago Lying-in Hospital, found 23 per cent. below 10 grm. Hb. (The social circumstances of Adair's series are not stated). In the present series the corresponding figure is approximately 13 per cent. below 10 grms. Hb. per 100 c.c. Orias (10) examined 22 women (Newcomer Van Slyke) and found an average of 13.4 grm. He then examined 51 pregnant women, and found an average of 12.91 grm.—a difference of 0.49 grm. between the two series. Davidson (4) had 19 pregnant women in his series, 3 or 15.8 per cent. in the group 85 per cent. and over in the Haldane scale, 10 or 52.6 per cent. in the group 70-84 per cent., and 6 or 36.4 per cent. in the group under 70 per cent. In the present series where the same method was used, the corresponding figures are 59 per cent. in the the group 85 per cent and over, 33.7 per cent in the second group and 7.2 per cent in the last group.

Moore (64) examined 100 pregnant women, using the Dare method. His average reading for primiparae was 76.8 per cent. and for multiparae 78.6 per cent. The cases were consecutive, and there was no selection. Five patients had nephritis, one had mitral stenosis, three had syphilis, and one had mild diabetes. Nineteen per cent. gave readings below 70 per cent. He concludes that there was no wide variation between the multiparae and primiparae. The nephritic group showed a substantial reduction, and the syphilitic group was lower also.

Rud (26) found a physiological anaemia in pregnant women. Bland, First and Goldstein (15), using a Dare haemoglobinometer, examined 200 dispensary patients, and found 82 per cent. of them below 74 per cent. haemoglobin. They also examined at the same time 100 private cases, and found only 62 per cent. of these with a haemoglobin reading below 74 per cent.

Kerwen and Collins (65) believe in the frequent occurrence of severe anaemia in pregnancy; that old multiparae are more prone, and that it is more liable to occur in late pregnancy.

Friedlander and Widemeyer (34) found the reticulocyte count increased during pregnancy. Galloway (66) considers that anaemia is frequent during pregnancy. Lyon (67) believes that the anaemia, when present, is not due to pregnancy per se, but to some underlying condition, such as retroversion.

It may be noted, in passing, that blood films of all cases below 70 per cent. in the present investigation were stained and examined. All the anaemias appeared to be secondary in type. No case was discovered which could be considered pernicious in character.

Out of the 35 cases in this series below 70 per cent. haemoglobin, 12 had abnormal pregnancies. Of the remaining 23, 14 had an income under £2, 9 had an income between £2 and £3, and none were in receipt of an income over £3. All the anaemias, therefore, could be traced to some co-existing condition, such as albuminuria, or to poor social circumstances. Further investigation is being made into the incidence of pernicious and secondary anaemia in the pregnant women, and a further series of approximately 500 cases is in process of being examined.

When the relationship of anaemia to abnormalities in pregnancy is considered, it is found in the group 85 per cent. haemoglobin and over, 14.63 per cent. of the pregnancies were abnormal; in the group 70-84 per cent. haemoglobin, 18.90 per cent. were abnormal, and in the group under 70 per cent., 40 per cent. were abnormal. This may be cause and effect, or vice versa.

When the resulting confinement is considered in the first group (85 per cent. haemoglobin and over), 13.31 per cent. were abnormal; in the second group (70-84 per cent.), 18.3 per cent. were abnormal, and in the third group (below 70 per cent.) 28 per cent. were abnormal.

If all cases with abnormal pregnancy are excluded and the confinements of the remainder considered, 12.60 per cent. in the group 85 per cent. and over were abnormal, 19.69 per cent. in the group 70-84 per cent. were abnormal, and 14.29 per cent. in the group below 70 per cent.

In the first group the child was born dead in 2.09 per cent. of the cases, in the second group in 5 per cent., and in the third group in 2.8 per cent.

If the live births only are considered, 1.78 per cent. died within the first four weeks in the first group, 1.92 per cent. died in the second group, and 5.88 per cent. died in the last group.

It is not clear from these figures what effect the incidence of anaemia has on the resulting confinement and survival of the child at birth, and the infantile death rate under 4 weeks. This point is being investigated more fully in this and a further series of approximately 500 cases.

SECTION VI.

SUMMARY AND CONCLUSIONS.

- (1) Two groups of women were examined. Group A. consisted of 45 unmarried women, and Group B. consisted of 486 pregnant women. The Haldane method was used, and examinations were made at varying times during the day. Group A. were examined before the onset of the menstrual flow, and midway in the menstrual cycle. The pregnant women in Group B. had the haemoglobin estimated on or about the 28th week, or if they presented themselves later, at the first examination at the Ante-natal Clinic.
- (2) The average value found for the unmarried women in Group A was 97.61 per cent. which compares closely with the normal as ascertained by Price Jones (2) by the same method. The average value for the pregnant women in Group B. was found to be 88.04 per cent. This is 9.51 per cent. less than the value found in Group A. This difference, in the author's opinion, is to be accounted for almost entirely by the difference in the social circumstances of the two groups, and not by the pregnant state per se.
- (3) The haemoglobin readings for five days before the onset of the menstrual flow have been studied in 32 cases. Each case was studied over three or four successive premenstrual periods.

No characteristic alteration was found either when individual premenstrual periods were studied, or when averages for corresponding days in each successive period were taken and compared. When the series as a whole was studied, no definite trend was found. The variation in the length of the menstrual cycle appeared to have no influence.

The variation in the haemoglobin level during pregnancy in 62 women was studied. of these 35.48 per cent. showed a rise, and 22.58 per cent. showed a fall before the 32nd week, and 21.74 per cent. showed a rise and 19.56 per cent. a fall after the 32nd week. The remainder did not show a variation greater than 6 per cent. or showed a rise and fall or vice versa. The incidence of abnormality in pregnancy, either as anaemia or some other condition, did not appear to influence the alteration in the haemoglobin level.

- (4) The average maximum variation over an extended period as measured by the Haldane scale did not appear to be materially different from that obtained from daily readings over a short period.

The imminence of the onset of the menstrual flow did not influence the amount of daily variation in the haemoglobin level.

The average variation was greater in the Sub-group where all observations were taken between 9 and 10 a.m., which confirms the opinion of other writers that the amount of variation is greater in the earlier part of the day.

The 7 cases which had an average haemoglobin reading below 90 per cent. and were relatively more anaemic than the other members of the group, showed greater variation than the average for the whole of Group A. The 3 tubercular patients showed much the same degree of variation as the rest of the group.

A seasonal variation was found, with a drop in the average haemoglobin level in the winter months, and a rise in the summer months.

The average haemoglobin reading, when taken over an extended period, did not appear to be affected by the alteration from day to night duty, or by the time of day at which the observations were taken.

- (5) In the series of pregnant women examined, the incidence of anaemia would not appear to be as great as that found by most other writers. Such anaemia as did occur could be accounted for by some abnormality in the pregnancy, or to poor or relatively poor social circumstances. The influence of anaemia on the resulting confinement and the survival of the child, was not clearly defined. The incidence of anaemia in pregnant women, and the various points of interest arising therefrom, is being investigated further in this and a further series of approximately 500 cases.

APPENDICES

APPENDIX A. Mean Haemoglobin Percentage.

APPENDIX B. Intermenstrual Observations.

APPENDIX C. Daily Observations.

APPENDIX D. Premenstrual Observations.

APPENDIX E. Detailed Records—Group A.

APPENDIX F. Detailed Records of 62 women in Group B.

APPENDIX A.

MEAN HAEMOGLOBIN PERCENTAGE—GROUP A.

Sub-group I.

Number	Mean Total Observations	Mean Intermenstrual Observations	Mean Daily Observations	Mean Premenstrual Observations					
				Total	1st day	2nd day	3rd day	4th day	5th day
5	98.67	100.00	99.67	98.00	94.50	94.67	102.00	102.00	98.00
6	107.73	104.89	105.33	110.46	108.00	108.00	112.00	116.00	110.00
8	97.17	97.25	97.00	97.60	97.20	102.00	96.50	98.00	98.00
9	86.71	86.86	84.67	87.00	84.67	87.50	89.33	91.00	82.00
10	102.00	104.00	...	102.00	104.00	100.00	...	...	...
12	98.64	101.33	99.67	97.00	96.80	97.00	99.33	94.00	...
13	101.06	101.71	101.00	103.07	100.00	102.67	99.00	109.00	107.33
15	96.73	96.50	94.00	97.62	96.50	98.50	97.50	97.00	99.00
17	100.10	96.86	101.67	100.60	97.50	98.00	102.00	104.00	102.67
18	95.29	96.25	93.33	95.43	97.60	93.50	88.00	93.00	100.00
19	94.54	96.22	95.33	93.67	96.50	91.33	92.67	93.00	94.00
25	76.00	74.86	73.33	79.56	89.00	92.00	83.00	69.00	71.00
28	96.81	97.78	95.33	96.77	97.50	98.00	99.00	89.00	...
30	101.48	100.57	104.33	101.00	102.00	92.00	99.00	104.50	103.00
31	101.56	102.66	...	101.20	96.00	102.00	96.00	104.00	108.00
32	101.91	100.28	103.33	102.30	101.50	103.50	102.67	102.00	100.00
37	97.80	92.00	...	99.25	100.00	99.33	96.00	104.00	...
38	101.69	101.20	103.33	100.67	103.33	100.50	99.33	102.00	96.00

APPENDIX A.
 MEAN HAEMOGLOBIN PERCENTAGE—GROUP A.
 Sub-group II.

Number	Mean Total Observations	Mean Intermenstrual Observations	Mean Daily Observations	Mean Premenstrual Observations					
				Total	1st day	2nd day	3rd day	4th day	5th day
1	106.08	107.00	106.80	105.50	105.50	108.00	103.00	98.00	108.00
2	89.31	89.56	91.20	88.60	89.60	87.50	92.00	86.00	84.00
3	100.45	100.22	105.00	98.58	96.80	98.50	100.00	98.00	104.00
4	90.29	89.00	...	94.00	...	...	...	94.00	94.00
7	99.19	101.56	100.00	97.62	99.20	95.00	99.50	97.33	93.00
11	108.30	106.40	...	109.50	109.33	104.00	116.00	108.00	...
14	98.71	101.33	...	...	...	...	...	...	...
16	98.43	99.00	...	100.00	99.33	100.50	101.00	100.00	...
20	79.67	...	...	80.00	78.00	72.00	...	...	90.00
21	79.38	78.67	...	81.00	...	76.00	...	81.00	82.67
22	97.00	98.86	101.33	94.46	94.00	92.00	94.00	98.00	...
23	96.00	99.00	...	90.00	90.00	...	...	...	...
24	103.29	103.00	...	103.38	106.50	100.00	100.50	104.67	102.00
26	90.67	93.00	...	86.00	86.00	...	...	...	...
27	101.73	101.20	106.00	94.00	94.00	94.00	...	...	...
29	99.36	100.00	106.40	96.31	97.00	97.00	...	95.33	95.00
33	95.33	94.00	...	96.31	97.20	94.50	98.00	96.00	...
34	96.74	94.80	...	97.83	97.00	95.50	98.00	99.33	104.00
35	104.83	107.33	...	104.00	104.00	106.00	100.00	106.00	...
36	98.00	99.50	...	97.50	96.67	92.00	98.00	101.00	108.00
39	100.78	101.50	104.40	99.71	96.00	99.00	100.67	106.00	99.00
40	99.67	98.67	101.33	98.92	101.33	95.00	101.33	99.00	100.00
41	106.45	106.00	...	107.60	110.67	107.00	103.33	114.00	106.00
42	102.19	102.40	...	102.25	97.00	100.00	104.00	108.00	104.00
43	104.53	103.67	...	104.85	100.67	111.00	102.00	...	108.00
44	89.37	88.80	...	89.63	88.00	89.33	94.00	87.00	86.00
45	78.70	78.00	...	79.20	76.67	82.00	76.00	...	82.00

APPENDIX B.
INTERMENSTRUAL OBSERVATIONS—GROUP A.
Sub-group I.

Number	Period observed in weeks	Average interval between each observation in days	Average day in Menstrual cycle when observation made	Haemoglobin Determinations												Maximum variation whole period	Largest variation one period to next
				July	August	September	October	November	December	January	February	March					
5	30	30	16.0	...	102	102	102	102	96	90	96	96	106	106	106	16	10
6	32	28	14.0	106	106	108	102	102	102	102	102	106	106	106	106	6	6
8	31	31	15.0	...	98	102	102	94	90	90	90	102	98	98	98	12	8
9	32	38	16.0	...	90	...	90	90	90	86	86	82	86	84	84	8	4
10	...	...	...	104	...	...	...	...	...	...	...	...	...	...	...	...	...
12	22	29	15.0	102	102	112	92	104	104	100	100	98	...	...	...	20	20
13	30	35	15.0	102	102	...	106	104	104	98	98	98	106	98	98	8	8
15	30	29	13.5	...	102	102	94	94	94	92	92	88/90	...	...	...	22	20
17	30	35	15.5	...	96	...	104	80	80	102	102	96	102	98	98	24	24
18	28	28	14.0	...	104	...	98/92	88	88	106	106	96	92	94	94	18	18
19	31	27	15.0	...	98	110	94	92	92	92/92	92	86	98	104	104	16	16
25	32	38	15.0	...	76	86	...	66	66	74	74	74	78	70	70	20	20
28	32	28	15.5	...	98	98	92	100	100	102	102	96	92/104	98	98	12	12
30	22	25	14.0	...	...	...	100/98	100	100	104	104	104	98	100	100	6	6
31	8	28	15.0	...	...	...	110	96/102	96/102	...	...	...	...	...	14	14	
32	24	27	16.0	...	...	100	98	92	92	98	98	102	104	108	16	6	
37	4	29	15.0	...	...	...	...	92	92	92	92	...	...	...	0	0	
38	18	31	16.0	...	...	...	...	100	100	96	96	102	102	106	10	6	

APPENDIX B.
INTERMENSTRUAL OBSERVATIONS—GROUP A.
Sub-group II.

Number	Period observed in weeks	Average interval between each observation in days	Average day in Menstrual cycle when observation made	Haemoglobin Determinations												Maximum variation whole period	Largest variation one period to next
				July	August	September	October	November	December	January	February	March					
1	33	30	16.0	98	112	...	114	106	110	100	110	100	110	106	16	14	
2	33	29	14.0	84	...	98	90/82	86	92	84	92	84	92	98	16	14	
3	34	30	16.0	88	102	108	100	92/98	106	...	106	...	94	26	20		
4	7	50	19.0	...	86	92	...	...	...	...	...	...	...	6	6
7	31	27	14.0	...	96/106	...	100	100/102	98	104	100	104	108	12	10		
11	14	24	16.0	...	...	...	...	...	104	102	102	106/106	114	12	8
14	13	41	15.0	...	...	...	...	...	98	102	102	...	104	6	4
16	28	27	15.0	...	100	100	96	102	104	100	100	100	90	14	10		
20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
21	8	27	15.0	...	...	...	...	...	...	82	82	72	82	10	10
22	25	29	16.0	...	...	98	...	92/98	92	100	100	102	110	18	8
23	3	25	16.0	94	104	...	...	...	...	...	...	...	...	10	10
24	13	29	15.0	...	...	...	...	...	96	102	102	110	104	14	8
26	9	58	15.5	...	96	...	90	...	...	...	...	...	...	6	6
27	15	26	15.0	...	...	...	...	100	98	94	94	112	102	18	18
29	25	35	15.0	...	...	108	94	94	96	96	86/98	106	102	14	14
33	23	27	14.0	...	...	...	96	96	92	92	86/98	96	94	12	12
34	16	28	15.0	...	...	...	104/94	96	90	90	90	...	...	14	10
35	8	28	15.0	...	...	...	104	104	114	...	...	...	...	10	10
36	10	25	15.0	...	...	...	102	102	92	102	102	...	...	10	10
39	20	46	15.0	...	...	...	102	96	102	...	...	...	...	10	10
40	22	32	15.0	...	...	...	86	94	98	94	...	...	106	10	6
41	22	31	15.0	...	...	...	104	102	106	104	104	108	112	26	14
42	15	26	15.0	...	...	...	...	102	106	98	104	104	116	14	12
43	17	25	15.0	...	...	...	...	102	106	102	102	102	104	8	8
44	16	28	14.0	...	...	...	...	100	98/108	94	94	114	108	20	20
45	16	29	15.0	...	...	...	...	92	90	84	84	84	94	10	10
				...	...	...	...	86	74	76	76	76	78	12	12

APPENDIX C.

DAILY OBSERVATION—GROUP A.

Sub-group I.

Number	Number of Observations	Days in Menstrual cycle when examined	Month when examined	Haemoglobin Determinations						Maximum variation
				1st day	2nd day	3rd day	4th day	5th day	6th day	
5	6	18—23	Feb.	106	94	100	100	100	98	12
6	6	14—19	Feb.	106	104	102	110	106	104	8
8	6	14—19	Feb.	98	94	96	98	98	98	4
9	6	16—21	Feb.	86	88	80	80	88	86	8
12	6	17—22	Jan.	98	98	106	100	100	96	10
13	6	14—19	Jan.	98	104	104	98	102	100	6
15	6	15—20	Jan./Feb.	90	90	88	98	98	100	12
17	6	12—17	Jan./Feb.	102	102	98	102	104	102	6
18	6	11—16	Jan.	84	94	96	100	96	90	16
19	6	15—20	Feb.	98	94	96	100	94	90	10
25	6	15—20	Feb.	78	76	64	72	78	72	14
28	6	16—21	Jan.	96	92	100	94	98	92	8
30	6	14—19	Jan.	104	104	106	102	108	102	6
32	6	18—23	Feb.	104	102	104	100	108	102	8
38	6	12—17	Feb.	110	104	98	102	100	106	12

APPENDIX C.

DAILY OBSERVATION—GROUP A.

Sub-group II.

Number	Number of Observations	Days in Menstrual cycle when examined	Month when examined	Haemoglobin Determinations						Maximum variation
				1st day	2nd day	3rd day	4th day	5th day	6th day	
1	5	17—22	Feb.	110	100	98	114	...	112	16
2	5	14—19	Feb.	92	90	92	92	...	90	2
3	6	12—17	Feb.	108	94	100	110	108	110	16
7	6	10—15	Feb.	98	100	98	104	100	100	6
22	6	14—19	Feb.	98	102	98	98	110	102	12
27	5	16—21	Jan.	110	96	112	106	...	106	16
29	5	14—19	Feb.	104	106	106	112	...	104	8
39	5	13—17	Mar.	102	106	106	100	108	...	8
40	6	10—15	Mar.	98	96	98	102	102	112	16

APPENDIX D.
PREMENSTRUAL OBSERVATIONS—GROUP A.
Sub-group I.

Number	Period observed in weeks	Total number of readings	Haemoglobin Determinations																									Maximum variation whole period	Maximum variation within period	Maximum variation one period to next					
			1st Premenstrual Period					2nd Premenstrual Period					3rd Premenstrual Period					4th Premenstrual Period					5th Premenstrual Period								6th Premenstrual Period				
			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5				1	2	3	4	5
5	17	14	92	98	100	...	...	102	...	108	106	...	88	90	96	...	...	96	96	104	98	98	...	...	...	...	...	...	...	...	...	20	8	20
6	17	13	110	112	110	108	112	120	...	106	100	106	116	110	...	118	108	20	12	18
8	15	15	94	102	102	...	...	106	...	...	...	...	96	...	94	102	100	94	...	96	100	96	96	...	94	92	...	...	...	...	...	14	8	12
9	14	15	90	92	86	...	...	...	94	94	104	88	86	86	88	...	...	78	78	78	76	82	...	...	...	...	...	...	...	...	...	28	16	18
10	2/7	2	104	100	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	4	...
12	21	14	100	96	...	...	...	102	104	104	...	...	88	...	...	...	...	96	96	102	96	...	98	92	92	92	...	...	...	...	...	16	6	16
13	15	15	96	...	...	...	...	102	110	...	...	...	104	...	108	114	120	100	100	...	104	104	98	98	90	...	98	...	...	...	...	30	16	20
15	20	16	98	102	94	94	98	100	92	...	100	94	94	98	...	94	...	100	98	102	104	12	8	10
17	22	20	...	104	100	108	102	102	96	108	108	106	96	90	98	...	100	92	100	...	100	...	100	100	102	100	...	...	...	...	...	18	12	18
18	21	14	100	...	...	...	...	104	102	...	94	102	84	92	...	92	98	102	88	88	...	...	98	92	...	...	...	...	...	...	...	20	14	20
19	25	18	104	94	...	102	98	102	94	90	86	84	94	94	92	...	90	88	...	92	90	100	92	20	10	18
25	19	9	86	...	...	...	...	92	92	94	...	...	...	...	...	68	68	...	...	72	70	74	...	...	...	...	...	...	...	...	...	26	4	26
28	11	13	106	102	98	...	...	92	...	102	90	...	94	96	94	...	...	98	96	102	88	...	...	...	...	...	...	...	...	...	...	18	14	16
30	13	14	100	...	104	98	...	106	90	94	106	104	102	94	...	108	...	100	...	...	106	102	...	...	...	...	...	...	...	...	...	18	16	18
31	5/7	5	96	102	96	104	108	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	12	12	...
32	16	13	100	106	112	...	...	100	112	98	102	100	100	102	98	...	...	106	94	...	...	...	...	...	...	...	...	...	...	...	...	18	14	14
37	9	8	100	94	94	...	...	100	100	98	...	...	...	104	...	104	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	10	6	6
38	16	12	...	94	94	102	96	104	100	...	...	...	100	106	102	...	...	106	102	102	...	...	...	...	...	...	...	...	...	...	...	12	8	10

APPENDIX D.
PREMENSTRUAL OBSERVATIONS—GROUP A.
Sub-group II.

Number	Period observed in weeks	Total number of readings	Haemoglobin Determinations																									Maximum variation whole period	Maximum variation within period	Maximum variation one period to next						
			1st Premenstrual Period					2nd Premenstrual Period					3rd Premenstrual Period					4th Premenstrual Period					5th Premenstrual Period								6th Premenstrual Period					
			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5				1	2	3	4	5	
1	12	12	116	112	104	...	...	104	112	...	...	...	106	108	...	98	...	96	100	102	...	108	...	...	...	...	...	...	...	...	20	12	14		
2	18	13	80	...	...	...	...	94	100	...	...	...	90	82	92	86	84	90	88	92	...	...	94	80	...	...	...	...	...	20	14	20			
3	19	17	...	98	100	104	...	104	106	102	100	104	96	...	...	...	...	96	...	104	90	...	92	92	...	...	...	96	98	94	...	...	16	14	14
4	...	1	...	...	94	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	18	16	100	...	102	96	...	100	92	98	...	...	102	...	96	96	86	92	...	...	...	...	102	98	102	100	100	...	...	...	...	...	16	16	16
11	8	8	104	104	112	108	...	112	...	120	...	...	112	104	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	16	8	16
14	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16	24	13	98	98	100	104	106	98	102	100	104	100	...	102	90	98	16	8	14
20	5/7	3	78	72	90	18	18	...
21	12	6	...	...	...	...	80	...	76	...	78	80	...	...	...	84	88	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	12	4	12
22	24	13	92	86	...	...	...	92	...	...	...	...	90	94	...	92	...	94	96	96	98	...	102	...	92	104	...	...	...	...	...	...	18	12	12
23	...	1	90
24	13	13	102	...	98	108	100	102	110	102	106	...	100	98	...	110	...	102	106	12	10	12
26	...	1	86
27	4	3	...	92	...	...	...	94	96	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	2	4
29	17	13	92	102	...	102	...	94	98	...	88	90	100	90	...	...	...	102	98	...	96	100	...	...	...	...	...	...	...	...	...	...	14	10	14
33	18	13	92	90	94	94	...	98	90	...	...	...	96	98	102	98	98	...	...	...	...	102	100	...	...	...	...	...	...	...	...	...	12	8	12
34	16	12	...	102	100	102	94	...	96	104	96	92	96	100	...	98	94	12	10	12
35	8	9	100	102	106	100	106	...	110	106	100	106	10	10	10
36	11	12	96	94	100	106	108	94	88	96	96	...	100	94	98	20	14	20
39	12	14	102	104	110	88	102	96	104	92	...	92	96	108	106	98	98	22	16	22
40	18	13	94	90	96	...	...	96	...	...	...	...	102	...	104	...	...	...	100	104	98	100	108	94	...	100	...	...	...	...	...	...	18	14	14
41	18	10	...	...	...	...	106	102	...	94	...	...	114	106	110	...	...	116	108	106	114	...	...	...	...	...	...	...	...	...	...	...	22	10	20
42	14	8	...	...	96	...	102	94	100	...	...	...	100	...	112	108	106	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	18	12	18
43	17	7	100	98	110	102	108	104	112	14	12	12
44	16	11	...	94	...	...	...	90	82	...	...	...	86	...	90	...	...	...	...	100	84	86	...	92	92	90	...	...	...	...	...	...	18	16	16
45	13	10	74	84	84	...	86	82	82	74	80	68	18	12	14

APPENDIX E.

DETAILED RECORDS OF GROUP A.

M.P.—Menstrual Flow Commenced.

D.R.—Daily Readings Midway in One Menstrual Cycle.

The Intermenstrual Readings are indicated by a line underneath, e.g.

22/8/33 112 10 a.m.

All Readings are given in Percentages of Haldane Scale.

CASE 1

CLERK.

Age— 25 years. *Menstruation commenced*—14 years.

Duration— 3—4 days.

Abnormalities— Dysmenorrhoea 1st day.

General Health— No serious illnesses.

Date	Hb. %	Time	Remarks
20/7/33	98	10-0 a.m.	
		M.P. ...	1/8/33.
22/8/33	112	10-0 a.m.	Holiday 12th—19th August.
		M.P. ...	Date unknown.
25/9/33	104	10-0 a.m.	
26/9/33	112	2-0 p.m.	
27/9/33	116	12 noon.	
		M.P. ...	28/9/33.
10/10/33	114	2-30p.m.	
23/10/33	112	2-0 p.m.	
24/10/33	104	2-0 p.m.	
		M.P. ...	25/10/33.
6/11/33	106	5-0 p.m.	
18/11/33	98	12 noon.	
20/11/33	108	10-0 a.m.	
21/11/33	106	10-0 a.m.	
		M.P. ...	21/11/33, 11-0 a.m.
4/12/33	110	5-0 p.m.	
16/12/33	108	12-30p.m.	
18/12/33	102	5-0 p.m.	Has a cold.
19/12/33	100	2-0 p.m.	
20/12/33	96	12 noon.	
		M.P. ...	21/12/33.
3/1/34	100	4-30p.m.	
		M.P. ...	20/1/34.
5/2/34	110	12-15p.m.	} D.R.
6/2/34	100	12-30p.m.	
7/2/34	98	12-15p.m.	
8/2/34	114	12 noon	
10/2/34	112	12 noon.	
		M.P. ...	17/2/34.
7/3/34	106	12 noon.	
		M.P. ...	17/3/34.

CASE 2

HEALTH VISITOR.

Age— 38 years. *Menstruation commenced*— 13 years.

Duration— 4 days.

Abnormalities— No dysmenorrhoea.

General Health— No serious illnesses.

Date	Hb. %	Time	Remarks
20/7/33	... 84 ...	12 noon.	
2/8/33	... 80 ...	12 noon.	
		M.P. ...	3/8/33.
		M.P. ...	30/8/33.
13/9/33	... 98 ...	12 noon.	
21/9/33	... 100 ...	10-30a.m.	
22/9/33	... 94 ...	5-15p.m.	
		M.P. ...	23/9/33.
7/10/33	... 90 ...	12 noon.	
		M.P. ...	16/10/33.
26/10/33	... 82 ...	12 noon.	
6/11/33	... 84 ...	4-30p.m.	
7/11/33	... 86 ...	2-30p.m.	
8/11/33	... 92 ...	10-0 a.m.	
9/11/33	... 82 ...	12 noon.	
10/11/33	... 90 ...	2-30p.m.	
		M.P. ...	11/11/33, 8-0 a.m.
27/11/33	... 86 ...	5-0 p.m.	
		M.P. ...	4/12/33, a.m.
16/12/33	... 92 ...	12-30p.m.	
27/12/33	... 92 ...	12-30p.m.	
28/12/33	... 88 ...	12 noon.	
29/12/33	... 90 ...	12 noon.	
		M.P. ...	30/12/33.
11/1/34	... 84 ...	1-0 p.m.	
22/1/34	... 80 ...	2-0 p.m.	
23/1/34	... 94 ...	4-30p.m.	
		M.P. ...	23/1/34.
5/2/34	... 92 ...	12-30p.m.	} D.R.
6/2/34	... 90 ...	12-30p.m.	
7/2/34	... 92 ...	12 noon.	
8/2/34	... 92 ...	1-0 p.m.	
10/2/34	... 90 ...	12-15p.m.	
		M.P. ...	19/2/34.
7/3/34	... 98 ...	12-30p.m.	

CASE 3

HEALTH VISITOR.

Age— 39 years. Menstruation commenced— 13½ years.

Duration— 5—6 days.

Abnormalities— Backache for 1 week before onset—very irregular until 21 years of age.

General Health— Measles and german measles in childhood. Has rheumatism.

Date	Hb. %	Time	Remarks
20/7/33	88	12 noon.	
		M.P. ...	31/7/33.
16/8/33	102	12 noon.	
23/8/33	104	12 noon.	
24/8/33	100	11-0 a.m.	
25/8/33	98	10-0 a.m.	
		M.P. ...	27/8/33.
13/9/33	108	12 noon.	
18/9/33	104	2-15p.m.	
19/9/33	100	4-30p.m.	
20/9/33	102	12-30p.m.	
21/9/33	106	11-0 a.m.	
22/9/33	104	5-0 p.m.	
		M.P. ...	23/9/33.
7/10/33	100	12 noon.	
17/10/33	96	2-30p.m.	
		M.P. ...	18//10/33, 11-0 a.m.
1/11/33	92	12 noon.	
10/11/33	90	2-30p.m.	
11/11/33	104	12 noon.	
13/11/33	96	4-30p.m.	
		M.P. ...	14/11/34.
27/11/33	98	5-0 p.m.	
8/12/33	92	4-30p.m.	
9/12/33	92	12 noon.	
		M.P. ...	10/12/33, noon.
27/12/33	106	12-30p.m.	
2/1/34	94	4-30p.m.	
3/1/34	98	12-30p.m.	
4/1/34	96	12-30p.m.	
		M.P. ...	5/1/34.
		M.P. ...	1/2/34.
12/2/34	108	12-30p.m.	} D.R.
13/2/34	94	12-30p.m.	
14/2/34	100	12 noon.	
15/2/34	110	12-15p.m.	
16/2/34	108	12-15p.m.	
17/2/34	110	12-30p.m.	
		M.P. ...	28/2/34.
15/3/34	114	12 noon.	

CASE 4

HEALTH VISITOR.

Age— 34 years. *Menstruation commenced*—12 years.

Duration— 4 days.

Abnormalities— Very irregular—no dysmenorrhoea.

General Health— Scarlet fever at 12 years; Jaundice at 19 years; Erysipelas at 22 years.

Date	Hb. %	Time	Remarks
21/7/33	... 94 ...	2-3op.m.	
22/7/33	... 80 ...	12 noon.	
24/7/33	... 94 ...	2-3op.m.	
		M.P. ...	28/7/33.
11/8/33	... 86 ...	9-45a.m.	
		M.P. ...	8/9/33.
30/9/33	... 92 ...	12 noon.	
		M.P. ...	7/10/33.
3/11/33	... 92 ...	2-0 p.m.	
4/11/33	... 94 ...	12-3op.m.	
		M.P. ...	9/11/33.
		M.P. ...	10/12/33.

CASE 5

NIGHT SISTER.

Age— 26 years. *Menstruation commenced*—14 years.

Duration— 4—5 days.

Abnormalities— No dysmenorrhoea—some discomfort occasionally.

General Health— Measles and whooping cough in childhood. Slight rheumatism at 21 years—3 weeks in bed—no ill effects.

Date	Hb. %	Time	Remarks
3/8/33	... 100 ...	9-15a.m.	Night duty all the time.
4/8/33	... 98 ...	9-0 a.m.	
5/8/33	... 92 ...	9-0 a.m.	
		M.P. ...	5/8/33, started p.m.
19/8/33	... 102 ...	9-15a.m.	
		M.P. ...	4/9/33.
18/9/33	... 102 ...	9-15a.m.	
29/9/33	... 106 ...	9-15a.m.	
30/9/33	... 108 ...	9-0 a.m.	
2/10/33	... 102 ...	9-15a.m.	
		M.P. ...	3/10/33, a.m. On holiday 7th—18th October.
18/10/33	... 102 ...	9-15a.m.	
30/10/33	... 96 ...	9-0 a.m.	Has had teeth extracted.
31/10/33	... 90 ...	9-15a.m.	
1/11/33	... 88 ...	9-45a.m.	Haemorrhage from tooth.
		M.P. ...	1/11/33, p.m.
15/11/33	... 96 ...	9-0 a.m.	
27/11/33	... 98 ...	9-0 a.m.	
28/11/33	... 98 ...	9-0 a.m.	
29/11/33	... 104 ...	9-30a.m.	
30/11/33	... 96 ...	9-15a.m.	
1/12/33	... 96 ...	9-15a.m.	
		M.P. ...	1/12/33, 10-0 p.m.
15/12/33	... 90 ...	9-0 a.m.	
		M.P. ...	2/1/34.
17/1/34	... 96 ...	9-15a.m.	
		M.P. ...	2/2/34.
19/2/34	... 106 ...	9-15a.m.	
20/2/34	... 94 ...	9-15a.m.	
21/2/34	... 100 ...	9-15a.m.	} D.R.
22/2/34	... 100 ...	9-15a.m.	
23/2/34	... 100 ...	9-30a.m.	
24/2/34	... 98 ...	9-30a.m.	
		M.P. ...	3/3/34.
17/3/34	... 106 ...	9-30a.m.	

CASE 6

DAY SISTER.

Age— 27 years. Menstruation commenced—14 years.

Duration— 2—3 days.

Abnormalities— No pain; slight discomfort.

General Health— Scarlet fever at 4 years; diphtheria at 8 years and 18 years; measles and whooping cough in childhood; jaundice in childhood and at 18 years.

Date	Hb. %	Time	Remarks
24/7/33	106	9-0 a.m.	Day duty all the time.
		M.P.	1/8/33.
16/8/33	106	9-15a.m.	
23/8/33	106	9-15a.m.	
24/8/33	112	9-0 a.m.	
25/8/33	110	9-15a.m.	
		M.P.	29/8/33.
12/9/33	108	9-0 a.m.	
25/9/33	120	9-0 a.m.	
26/9/33	112	9-0 a.m.	
27/9/33	108	9-0 a.m.	
28/9/33	110	9-0 a.m.	
		M.P.	28/9/33, p.m.
12/10/33	102	9-0 a.m.	Has a cold.
28/10/33	106	9-15a.m.	Still has a cold.
		M.P.	29/10/33, a.m.
14/11/33	102	9-0 a.m.	
24/11/33	106	9-30a.m.	
25/11/33	100	9-30a.m.	
		M.P.	25/11/33, 8-0 p.m.
9/12/33	102	9-30a.m.	
		M.P.	25/12/33, 10-0 a.m.
8/1/34	106	9-30a.m.	
18/1/34	112	9-30a.m.	
19/1/34	108	9-30a.m.	
20/1/34	118	9-30a.m.	
22/1/34	110	9-30a.m.	
23/1/34	116	9-0 a.m.	
		M.P.	23/1/34—3-0 p.m.
5/2/34	106	9-0 a.m.	
6/2/34	104	9-15a.m.	D.R.
7/2/34	102	9-30a.m.	
8/2/34	110	9-15a.m.	
9/2/34	106	9-30a.m.	
10/2/34	104	9-30a.m.	
		M.P.	22/2/34.
8/3/34	106	10-0 a.m.	
		M.P.	24/3/34.
		M.P.	22/5/34.

CASE 7

TEMPORARY NURSE.

Age— 27 years. Menstruation commenced—10 years.

Duration— 8 days.

Abnormalities— Dysmenorrhoea.

General Health— Scarlet fever at 20 years.

Date	Hb. %	Time	Remarks
3/8/33	96	9-0 a.m.	Night duty.
		M.P. ...	9/8/33.
23/8/33	106	9-30a.m.	Night duty.
		M.P. ...	2/9/33.
22/9/33	96	11-30a.m.	At home.
23/9/33	102	12 noon.	At home.
25/9/33	100	9-15a.m.	Night duty.
		M.P. ...	26/9/33, a.m.
9/10/33	100	9-15a.m.	Night duty.
17/10/33	98	9-0 a.m.	Night duty.
18/10/33	92	3-30p.m.	At home.
19/10/33	100	11-0 a.m.	At home.
		M.P. ...	20/10/33.
1/11/33	100	9-30a.m.	Day duty.
9/11/33	86	9-15a.m.	Day duty.
10/11/33	96	9-45a.m.	Day duty.
11/11/33	96	9-15a.m.	Night duty.
13/11/33	102	9-0 a.m.	Night duty.
		M.P. ...	14/11/33, 2-0 a.m.
27/11/33	102	9-15a.m.	Day duty.
		M.P. ...	3/12/33.
16/12/33	98	9-15a.m.	Day duty.
27/12/33	92	9-45a.m.	Night duty.
		M.P. ...	28/12/33, 7-0 a.m.
10/1/34	104	9-15a.m.	Day duty.
19/1/34	100	9-30a.m.	Day duty.
20/1/34	98	9-30a.m.	Day duty.
22/1/34	100	9-30a.m.	Day duty.
23/1/34	100	9-15a.m.	Day duty.
24/1/34	102	9-30a.m.	Day duty.
25/1/34	98	9-30a.m.	Day duty.
26/1/34	102	9-30a.m.	Day duty.
		M.P. ...	27/1/34.
5/2/34	98	9-15a.m.	Day duty.
6/2/34	100	9-15a.m.	Day duty.
7/2/34	98	9-30a.m.	Day duty.
8/2/34	104	9-30a.m.	Day duty.
9/2/34	100	9-30a.m.	Day duty.
10/2/34	100	9-30a.m.	Day duty.
		M.P. ...	24/2/34.
8/3/34	108	9-30a.m.	Day duty.
		M.P. ...	24/3/34.

D.R.

CASE 8

NURSE.

Age— 26 years. Menstruation commenced—13½ years.

Duration— 3 days.

Abnormalities— Dysmenorrhoea 1st day; periods regular except at age of 17 years, when occurred every six weeks for a short period.

General Health— Measles and scarlet fever in childhood; influenza 3 years ago.

Date	Hb. %	Time	Remarks
5/8/33	98	9-30a.m.	Day duty.
16/8/33	102	9-30a.m.	Day duty.
17/8/33	102	9-15a.m.	Day duty.
18/8/33	94	9-30a.m.	Day duty.
		M.P. ...	18/8/33, 5-0 p.m.
12/9/33	106	9-15a.m.	Day duty.
		M.P. ...	13/9/33.
27/9/33	102	9-15a.m.	Day duty.
5/10/33	100	9-45a.m.	Day duty.
6/10/33	102	9-30a.m.	Day duty.
7/10/33	94	9-30a.m.	Day duty.
9/10/33	96	9-30a.m.	Day duty.
		M.P. ...	10/10/33, 7-30 a.m.
23/10/33	94	9-0 a.m.	Day duty.
2/11/33	96	9-45a.m.	Day duty.
3/11/33	100	9-45a.m.	Day duty.
4/11/33	96	9-45a.m.	Day duty.
6/11/33	94	9-45a.m.	Day duty.
		M.P. ...	7/11/33, 10-30 p.m.
20/11/33	90	9-30a.m.	Night duty begins this p.m.
1/12/33	92	9-15a.m.	Night duty.
2/12/33	94	9-15a.m.	Night duty.
4/12/33	96	9-0 a.m.	Night duty.
		M.P. ...	5/12/33, 5-0 a.m.
18/12/33	96	9-30a.m.	Day duty.
		M.P. ...	1/1/34.
15/1/34	102	9-30a.m.	Night duty.
16/1/34	92	9-0 a.m.	Night duty.
		M.P. ...	30/1/34.
12/2/34	98	9-0 a.m.	Night duty.
13/2/34	94	9-0 a.m.	Night duty.
14/2/34	96	9-0 a.m.	Night duty.
15/2/34	98	9-0 a.m.	Night duty.
16/2/34	98	9-0 a.m.	Night duty.
17/2/34	98	9-15a.m.	Night duty.
		M.P. ...	24/2/34.
12/3/34	98	9-15a.m.	

D.R.

CASE 9

NURSE.

Age— 24 years. *Menstruation commenced*—13 years.

Duration— 4 days.

Abnormalities— No dysmenorrhoea.

General Health— Scarlet fever at 19 years.

Date	Hb. %	Time	Remarks
3/8/33	90	9-30a.m.	Night duty.
16/8/33	86	9-15a.m.	Night duty.
17/8/33	92	9-15a.m.	Night duty.
18/8/33	90	9-15a.m.	Night duty.
		M.P. ...	18/8/33, 8-0 p.m.
12/9/33	98	9-15a.m.	Night duty.
13/9/33	88	9-0 a.m.	Night duty.
14/9/33	104	9-15a.m.	Night duty.
15/9/33	94	9-0 a.m.	Night duty.
16/9/33	94	9-15a.m.	Night duty.
		M.P. ...	18/9/33, 7-30 a.m.
2/10/33	90	9-30a.m.	Day duty.
16/10/33	88	9-45a.m.	Day duty.
17/10/33	86	9-30a.m.	Day duty.
18/10/33	86	9-15a.m.	Day duty.
		M.P. ...	19/10/33, 8-0 a.m.
3/11/33	90	9-30a.m.	Day duty.
16/11/33	82	9-15a.m.	Day duty.
17/11/33	76	9-0 a.m.	Day duty.
18/11/33	78	9-30a.m.	Day duty.
20/11/33	78	9-30a.m.	Day duty.
21/11/33	78	9-30a.m.	Day duty.
		M.P. ...	22/11/33, 6-0 a.m.
6/12/33	86	9-30a.m.	Day duty.
		M.P. ...	28/12/33.
11/1/34	82	9-0 a.m.	Day duty.
		M.P. ...	28/1/34, 3-0 p.m.
12/2/34	86	9-0 a.m.	Day duty.
13/2/34	88	9-0 a.m.	Day duty.
14/2/34	80	9-30a.m.	Day duty.
15/2/34	80	9-30a.m.	Day duty.
16/2/34	88	9-0 a.m.	Day duty.
17/2/34	86	9-15a.m.	Day duty.
		M.P. ...	2/3/34, 11-0 p.m.
17/3/34	84	9-15a.m.	Night duty.

} D.R.

CASE 10

NURSE.

Age— 19 years.

General Health— Good—no further particulars.

Date	Hb. %	Time	Remarks
3/8/33	... 100 ...	9-45a.m.	Day duty.
9/8/33	... 100 ...	9-15a.m.	Day duty.
10/8/33	... 104 ...	9-15a.m.	Day duty.
		M.P. ...	11/8/33.
25/8/33	... 104 ...	9-15a.m.	Night duty.

LEFT.

CASE 11

NURSE.

Age— 27 years. *Menstruation commenced*— 17 years.

Duration—3 days.

Abnormalities—Nil.

General Health— Good.

Date	Hb. %	Time	Remarks
		M.P. ...	1/12/33.
18/12/33	... 104 ...	9-0 a.m.	Day duty.
		M.P. ...	24/12/33, a.m.
6/1/34	... 102 ...	8-50a.m.	Day duty.
15/1/34	... 108 ...	9-0 a.m.	Day duty.
16/1/34	... 112 ...	12-25p.m.	Day duty.
17/1/34	... 104 ...	8-50a.m.	Day duty.
18/1/34	... 104 ...	9-55a.m.	Day duty.
		M.P. ...	19/1/34, a.m.
2/2/34	... 106 ...	8-45a.m.	
10/2/34	... 120 ...	9-5 a.m.	Night duty.
12/2/34	... 112 ...	9-0 a.m.	Night duty.
		M.P. ...	13/2/34.
27/2/34	... 106 ...	8-40a.m.	Night duty.
9/3/34	... 104 ...	8-40a.m.	Night duty.
10/3/34	... 112 ...	9-0 a.m.	Night duty.
		M.P. ...	11/3/34.
26/3/34	... 114 ...	8-55a.m.	Day duty.

CASE 12

NURSE.

Age— 20 years. *Menstruation commenced*—13 years.

Duration— 4 days.

Abnormalities— Slight discomfort.

General Health— No illnesses; always feels well.

Date	Hb. %	Time	Remarks
8/8/33	96	9-30a.m.	Day duty.
9/8/33	100	9-30a.m.	Day duty.
		M.P. ...	9/8/33, 12 noon.
23/8/33	102	9-30a.m.	Day duty.
		M.P. ...	7/9/33.
20/9/33	112	9-15a.m.	Night duty begins this p.m.
3/10/33	104	9-30a.m.	Night duty.
4/10/33	104	9-30a.m.	Night duty.
5/10/33	102	9-45a.m.	Night duty.
		M.P. ...	6/10/33, a.m.
20/10/33	92	9-30a.m.	Night duty.
1/11/33	88	9-45a.m.	Night duty.
		M.P. ...	2/11/33, 4-0 a.m.
15/11/33	104	9-15a.m.	Night duty.
27/11/33	96	9-0 a.m.	Night duty.
28/11/33	102	9-0 a.m.	Night duty.
29/11/33	96	9-30a.m.	Night duty.
30/11/33	96	9-30a.m.	Night duty.
		M.P. ...	1/12/33, 4-0 a.m.
15/12/33	100	9-15a.m.	Night duty.
27/12/33	92	9-15a.m.	Night duty.
28/12/33	92	9-15a.m.	Night duty.
29/12/33	92	9-15a.m.	Night duty.
30/12/33	98	9-30a.m.	Night duty.
		M.P. ...	30/12/33, 6-0 p.m.
15/1/34	98	9-45a.m.	Day duty.
16/1/34	98	9-30a.m.	Day duty.
17/1/34	106	9-45a.m.	Day duty.
18/1/34	100	9-45a.m.	Day duty.
19/1/34	100	9-45a.m.	Day duty.
20/1/34	96	9-30a.m.	Day duty.
		M.P. ...	26/1/34.

} D.R.

LEFT.

CASE 13

NURSE.

Age— 21 years. Menstruation commenced—14 years.

Duration— 3 days.

Abnormalities— No dysmenorrhoea.

General Health—Measles in childhood; scarlet fever at 10 years.

Date	Hb. %	Time	Remarks
24/7/33	96	9-0 a.m.	Day duty.
		M.P. ...	25/7/33.
8/8/33	102	9-15a.m.	Day duty.
18/8/33	110	9-45a.m.	Day duty.
19/8/33	102	9-15a.m.	Day duty.
		M.P. ...	20/8/33.
14/9/33	120	9-45a.m.	Day duty.
15/9/33	114	9-15a.m.	Day duty.
16/9/33	108	9-0 a.m.	Day duty.
18/9/33	104	9-30a.m.	Day duty.
		M.P. ...	18/9/33, 3-0 p.m.
2/10/33	106	9-45a.m.	Day duty.
13/10/33	104	9-45a.m.	Day duty.
14/10/33	104	9-45a.m.	Day duty.
16/10/33	100	9-30a.m.	Day duty.
17/10/33	100	9-45a.m.	Day duty.
		M.P. ...	18/10/33, 5-0 a.m.
2/11/33	104	9-15a.m.	Day duty.
13/11/33	94	9-30a.m.	Day duty.
14/11/33	92	9-15a.m.	Day duty.
15/11/33	96	9-15a.m.	Night duty began last evening.
16/11/33	92	9-15a.m.	Night duty.
17/11/33	94	9-30a.m.	Night duty.
18/11/33	98	9-45a.m.	Night duty.
20/11/33	90	9-15a.m.	Night duty.
21/11/33	98	9-30a.m.	Night duty.
22/11/33	98	9-30a.m.	Night duty.
		M.P. ...	22/11/22, 11-0 p.m.
6/12/33	98	9-15a.m.	Day duty.
		M.P. ...	26/12/33.
8/1/34	98	9-30a.m.	Night duty.
9/1/34	104	9-30a.m.	Night duty.
10/1/34	104	9-15a.m.	Night duty.
11/1/34	98	9-15a.m.	Night duty.
12/1/34	102	9-15a.m.	Night duty.
13/1/34	100	9-15a.m.	Night duty.
		M.P. ...	22/1/34.
5/2/34	106	9-45a.m.	Day duty.
		M.P. ...	21/2/34.
7/3/34	98	9-0 a.m.	Day duty.
		M.P. ...	21/3/34.

D.R.

CASE 14

NURSE.

Age— 19 years. *Menstruation commenced*—13 years,

Duration— 4 days.

Abnormalities— Nil.

General Health— Good.

Date	Hb. %	Time	Remarks
		M.P. ...	7/12/33.
21/12/33	... 98	12-30p.m.	Day duty.
2/1/34	... 100	2-30p.m.	Day duty.
3/1/34	... 96	2-0 p.m.	Day duty.
4/1/34	... 94	9-0 a.m.	Day duty.
5/1/34	... 96	1-30p.m.	Day duty.
6/1/34	... 100	10-30a.m.	Day duty.
8/1/34	... 100	12 noon.	Day duty.
		M.P. ...	16/1/34.
30/1/34	... 102	9-0 a.m.	Day duty.
20/2/34	... 100	9-30a.m.	Day duty.
21/2/34	... 100	9-30a.m.	Day duty.
22/2/34	... 102	9-30a.m.	Day duty.
23/2/34	... 98	9-30a.m.	Day duty.
24/2/34	... 92	9-30a.m.	Day duty.
		M.P. ...	6/3/34.
20/3/34	... 104	9-0 a.m.	Day duty.
		M.P. ...	7/5/34.

CASE 15

NURSE.

Age— 24 years. Menstruation commenced— 15 years.

Duration— 3—4 days.

Abnormalities— No dysmenorrhoea.

General Health— Measles and whooping cough in childhood; otherwise nil.

Date	Hb. %	Time	Remarks
		M.P. ...	28/7/33.
11/8/33	... 102 ...	9-0 a.m.	Day duty.
23/8/33	... 94 ...	9-45a.m.	Day duty.
24/8/33	... 102 ...	9-15a.m.	Day duty.
25/8/33	... 98 ...	9-30a.m.	Day duty.
		M.P. ...	25/8/33.
		M.P. ...	16/9/33—Fell off tram.
30/9/33	... 102 ...	9-15a.m.	Day duty.
		M.P. ...	8/10/33.
23/10/33	... 94 ...	10-30a.m.	Day duty.
31/10/33	... 92 ...	9-0 a.m.	Day duty.
1/11/33	... 100 ...	9-0 a.m.	Day duty.
2/11/33	... 98 ...	9-45a.m.	Day duty.
3/11/33	... 94 ...	10-0 a.m.	Day duty.
		M.P. ...	3/11/33—11-0 a.m.
15/11/33	... 94 ...	9-45a.m.	Day duty.
25/11/33	... 100 ...	9-45a.m.	Day duty.
		M.P. ...	26/11/33—7-0 p.m.
7/12/33	... 92 ...	9-45a.m.	Day duty.
15/12/33	... 94 ...	9-45a.m.	Day duty.
16/12/33	... 94 ...	9-45a.m.	Day duty.
18/12/33	... 98 ...	9-45a.m.	Day duty.
19/12/33	... 94 ...	9-45a.m.	Day duty.
20/12/33	... 94 ...	9-15a.m.	Day duty.
		M.P. ...	20/12/33—8-0 p.m.
2/1/34	... 88 ...	9-30a.m.	Day duty.
10/1/34	... 104 ...	9-30a.m.	Day duty.
11/1/34	... 102 ...	9-30a.m.	Day duty.
12/1/34	... 98 ...	9-30a.m.	Day duty.
13/1/34	... 100 ...	9-30a.m.	Day duty.
		M.P. ...	15/1/34—8-30 a.m.
29/1/34	... 90 ...	9-0 a.m.	Night duty.
30/1/34	... 90 ...	9-45a.m.	Night duty.
31/1/34	... 88 ...	9-15a.m.	Night duty.
1/2/34	... 98 ...	9-15a.m.	Night duty.
2/2/34	... 98 ...	9-15a.m.	Night duty.
3/2/34	... 100 ...	9-0 a.m.	Night duty.
		M.P. ...	10/2/34—11-0 a.m.
12/2/34	... 110 ...	9-15a.m.	Night duty.
		M.P. ...	6/3/34.

D.R.

CASE 16

NURSE.

Age— 21 years. *Menstruation commenced*— 14 years.

Duration— 3—4 days.

Abnormalities— Occasional dysmenorrhoea.

General Health— No illnesses.

Date	Hb. %	Time	Remarks
8/8/33	... 98	9-0 a.m.	Day duty.
9/8/33	... 98	9-30a.m.	Day duty.
		M.P. ...	9/8/33—10-0 p.m.
25/8/33	... 100	10-45a.m.	Day duty.
		M.P. ...	8/9/33.
23/9/33	... 100	11-30a.m.	Day duty.
5/10/33	... 100	9-0 a.m.	Night duty.
		M.P. ...	6/10/33.
19/10/33	... 96	9-0 a.m.	Night duty.
1/11/33	... 98	9-0 a.m.	Night duty.
2/11/33	... 106	8-45a.m.	Night duty.
3/11/33	... 104	9-0 a.m.	Night duty.
		M.P. ...	4/11/33.
18/11/33	... 102	12-30p.m.	Day duty.
29/11/33	... 100	12-30p.m.	Day duty.
30/11/33	... 104	2-0 p.m.	Day duty.
1/12/33	... 100	12-30p.m.	Day duty.
2/12/33	... 102	5-30p.m.	Day duty.
		M.P. ...	3/12/33.
16/12/33	... 104	10-0 a.m.	Night duty.
28/12/33	... 102	9-45a.m.	Day duty.
		M.P. ...	29/12/33—a.m.
12/1/34	... 100	9-45a.m.	Day duty.
23/1/34	... 98	9-15a.m.	Night duty.
24/1/34	... 90	9-15a.m.	Night duty.
		M.P. ...	24/1/34—2-0 p.m.
5/2/34	... 100	9-15a.m.	Night duty.
		M.P. ...	20/2/34.
5/3/34	... 90	9-45a.m.	Night duty.
6/3/34	... 88	9-45a.m.	Night duty.
7/3/34	... 84	10-0 a.m.	Night duty.
			Became ill with an attack of rheumatism.

CASE 17

NURSE.

Age— 25 years. Menstruation commenced— 15 years.

Duration— 5 days.

Abnormalities— Severe dysmenorrhoea.

General Health— Measles and pneumonia in childhood;
diphtheria at 18 years.

Date	Hb. %	Time	Remarks
5/8/33	96	9-30a.m.	Day duty.
16/8/33	102	9-30a.m.	Night duty.
17/8/33	108	10-0 a.m.	Night duty.
18/8/33	100	9-45a.m.	Night duty.
19/8/33	104	9-30a.m.	Night duty.
		M.P. ...	21/8/33, p.m.
14/9/33	110	9-15a.m.	Night duty.
15/9/33	110	9-15a.m.	3 days leave.
19/9/33	106	9-0 a.m.	Day duty.
20/9/33	108	9-0 a.m.	Day duty.
21/9/33	108	9-15a.m.	Day duty.
22/9/33	96	9-15a.m.	Day duty.
23/9/33	102	9-15a.m.	Day duty.
		M.P. ...	23/9/33—10-30 a.m.
9/10/33	104	9-15a.m.	Day duty.
18/10/33	92	9-30a.m.	Day duty.
19/10/33	102	9-45a.m.	Day duty.
20/10/33	96	9-45a.m.	Day duty.
21/10/33	100	9-45a.m.	Day duty.
23/10/33	98	9-30a.m.	Day duty.
24/10/33	90	9-30a.m.	Day duty.
25/10/33	96	9-30a.m.	Day duty.
		M.P. ...	25/10/33—3-0 p.m.
9/11/33	80	9-30a.m.	Day duty.
		M.P. ...	22/11/33.
6/12/33	102	9-30a.m.	Day duty.
16/12/33	100	9-45a.m.	Day duty.
18/12/33	100	9-30a.m.	Day duty.
19/12/33	92	9-15a.m.	Day duty.
		M.P. ...	19/12/33—2-0 p.m.
2/1/34	96	9-30a.m.	Day duty.
13/1/34	96	9-30a.m.	Day duty.
15/1/34	100	9-30a.m.	Day duty.
16/1/34	102	9-30a.m.	Day duty.
17/1/34	100	9-30a.m.	Day duty.
18/1/34	100	9-30a.m.	Day duty.
		M.P. ...	18/1/34—p.m.
29/1/34	102	9-15a.m.	Day duty.
30/1/34	102	9-30a.m.	Day duty.
31/1/34	98	9-15a.m.	Day duty.
1/2/34	102	9-15a.m.	Day duty.
2/2/34	104	9-15a.m.	Day duty.
3/2/34	102	9-15a.m.	Day duty.
		M.P. ...	15/2/34.
1/3/34	98	9-0 a.m.	Day duty.
		M.P. ...	18/3/34.

D.R.

CASE 18

NURSE.

Age— 21 years. Menstruation commenced— 13 years.

Duration— 4 days.

Abnormalities— Regular until February, year 1932; only one period between February and October—in August; was very bad; irregular since.

General Health— Measles and german measles; otherwise good.

Date	Hb. %	Time	Remarks
3/8/33	100	10-0 a.m.	Day duty.
		M.P. ...	3/8/33—later.
17/8/33	104	9-45a.m.	Day duty.
		M.P. ...	20/8/33.
14/9/33	98	9-45a.m.	Night duty.
15/9/33	102	9-30a.m.	Night duty.
16/9/33	94	9-30a.m.	Night duty.
18/9/33	102	9-30a.m.	Night duty.
19/9/33	104	9-30a.m.	Night duty.
		M.P. ...	19/9/33—p.m.
3/10/33	98	9-15a.m.	Day duty.
		M.P. ...	14/10/33.
26/10/33	92	9-45a.m.	Day duty.
3/11/33	98	10-0 a.m.	Day duty.
4/11/33	92	10-0 a.m.	Day duty.
6/11/33	92	9-30a.m.	Day duty.
7/11/33	84	9-15a.m.	Day duty.
		M.P. ...	8/11/33—3-0 a.m.
20/11/33	88	9-15a.m.	Day duty.
30/11/33	88	9-30a.m.	Night duty commenced 28/11/33.
1/12/33	88	9-30a.m.	Night duty.
2/12/33	102	9-30a.m.	Night duty. Septic spot on finger.
		M.P. ...	3/12/33.
15/12/33	106	9-30a.m.	Has had three days off. Restarting night duty to-night.
27/12/33	92	9-30a.m.	Night duty.
28/12/33	98	9-30a.m.	Night duty.
		M.P. ...	29/12/33—3-0 a.m.
8/1/34	84	9-0 a.m.	Night duty.
9/1/34	94	9-15a.m.	Night duty.
10/1/34	96	9-0 a.m.	Night duty.
11/1/34	100	9-15a.m.	Night duty.
12/1/34	96	9-15a.m.	Night duty.
13/1/34	90	9-0 a.m.	Night duty.
		M.P. ...	23/1/34—a.m.
6/2/34	92	9-45a.m.	Night duty.
		M.P. ...	15/2/34.
1/3/34	94	9-45a.m.	Night duty.
		M.P. ...	11/3/34.

D.R.

CASE 19

NURSE.

Age— 19 years. *Menstruation commenced*— 13 years.

Duration— 2 days; 4 days if longer than month.

Abnormalities— Always irregular; occasionally three months interval; slight discomfort.

General Health— Measles and whooping cough in childhood; tonsils removed.

Date	Hb. %	Time	Remarks
		M.P. ...	26/7/33.
9/8/33	98	9-45a.m.	Day duty.
		M.P. ...	16/8/33.
11/9/33	104	9-45a.m.	Day duty.
		M.P. ...	12/9/33.
26/9/33	110	9-15a.m.	Day duty.
5/10/33	102	10-0 a.m.	Day duty.
6/10/33	98	9-45a.m.	Day duty.
7/10/33	102	9-0 a.m.	Day duty.
9/10/33	94	9-15a.m.	Day duty.
		M.P. ...	10/10/33—7-30 a.m.
24/10/33	94	9-30a.m.	Day duty.
		M.P. ...	1/11/33.
15/11/33	92	9-30a.m.	Day duty.
		M.P. ...	22/11/33.
6/12/33	92	9-45a.m.	Day duty.
11/12/33	94	9-30a.m.	Day duty.
12/12/33	94	8-45a.m.	Day duty.
13/12/33	84	9-30a.m.	Day duty.
14/12/33	86	9-15a.m.	Day duty.
15/12/33	90	9-30a.m.	Day duty.
16/12/33	94	9-30a.m.	Day duty.
		M.P. ...	16/12/33—p.m.
30/12/33	92	9-30a.m.	Day duty.
5/1/34	88	9-30a.m.	Day duty.
6/1/34	90	9-15a.m.	Day duty.
8/1/34	92	9-15a.m.	Day duty.
9/1/34	94	9-30a.m.	Has a day off.
		M.P. ...	10/1/34—9-0 a.m.
24/1/34	86	9-30a.m.	Day duty.
31/1/34	92	9-30a.m.	Day duty.
1/2/34	100	9-30a.m.	Day duty.
2/2/34	90	9-30a.m.	Day duty.
3/2/34	92	9-30a.m.	Day duty.
		M.P. ...	5/2/34—early a.m.
19/2/34	98	9-30a.m.	Day duty.
20/2/34	94	9-30a.m.	Day duty.
21/2/34	96	9-30a.m.	Day duty.
22/2/34	100	9-15a.m.	Day duty.
23/2/34	94	9-30a.m.	Day duty.
24/2/34	90	9-30a.m.	Day duty.
		M.P. ...	3/3/34.
17/3/34	104	9-45a.m.	

D.R.

CASE 20

NURSE.

Age— 28. Menstruation commenced— 15 years.

Duration— 3 days.

Abnormalities— Nil.

General Health— Good; rather anaemic.

Date	Hb. %	Time	Remarks
3/8/33	... 78	1-0 p.m.	Day duty.
9/8/33	... 74	10-15a.m.	Day duty.
10/8/33	... 86	10-0 a.m.	Day duty.
11/8/33	... 90	11-0 a.m.	Day duty.
14/8/33	... 72	4-30p.m.	Day duty.
15/8/33	... 78	3-0 p.m.	Day duty.
		M.P. ...	16/8/33.
			On sick leave with anaemia and general debility.

CASE 21

TUBERCULAR PATIENT.

Age— 23 years. Menstruation commenced— 15 years.

Duration— 5 days.

Abnormalities— Premenstrual dysmenorrhoea.

General Health— T.B. lungs.

Date	Hb. %	Time	Remarks
18/12/33	... 78	10-30a.m.	
20/12/33	... 74	2-0 p.m.	
21/12/33	... 78	12-30p.m.	
22/12/33	... 80	2-0 p.m.	
		M.P. ...	27/12/33.
10/1/34	... 82	12-45p.m.	In bed.
22/1/34	... 80	12-30p.m.	
23/1/34	... 78	1-45p.m.	
25/1/34	... 76	12-30p.m.	
		M.P. ...	27/1/34.
10/2/34	... 72	11-30a.m.	
		M.P. ...	19/2/34.
5/3/34	... 82	9-0 a.m.	
15/3/34	... 80	1-0 p.m.	
16/3/34	... 88	4-30p.m.	
17/3/34	... 84	12 noon.	
		M.P. ...	21/3/34.

CASE 22

STAFF NURSE.

Age— 22 years. Menstruation commenced— 16 years.

Duration— 3—4 days.

Abnormalities— Always irregular; occasional dysmenorrhoea.

General Health— No illnesses.

Date	Hb. %	Time	Remarks
18/8/33	... 86	12-15p.m.	Day duty.
19/8/33	... 92	11-30a.m.	Day duty.
		M.P. ...	20/8/33.
14/9/33	... 92	3-45p.m.	Day duty.
		M.P. ...	14/9/33.
30/9/33	... 98	12 noon.	Day duty.
		M.P. ...	18/10/33.
1/11/33	... 92	9-0 a.m.	Day duty.
11/11/33	... 92	11-0 a.m.	Day duty.
13/11/33	... 94	11-0 a.m.	Day duty.
14/11/33	... 90	2-0 p.m.	Day duty.
		M.P. ...	15/11/33.
29/11/33	... 98	12-45p.m.	Day duty.
9/12/33	... 96	11-0 a.m.	Day duty.
11/12/33	... 98	12-30p.m.	Day duty.
12/12/33	... 96	2-0 p.m.	Day duty.
13/12/33	... 96	10-30a.m.	Day duty.
14/12/33	... 94	1-0 p.m.	Day duty.
		M.P. ...	15/12/33.
29/12/33	... 92	1-0 p.m.	Day duty.
		M.P. ...	10/1/34.
25/1/34	... 100	12-30p.m.	Day duty.
2/2/34	... 104	2-0 p.m.	Day duty.
3/2/34	... 92	12 noon.	Day duty.
5/2/34	... 102	2-0 p.m.	Day duty.
		M.P. ...	6/2/34.
19/2/34	... 98	12-15p.m.	Day duty.
20/2/34	... 102	2-0 p.m.	Day duty.
21/2/34	... 98	12-15p.m.	Day duty.
22/2/34	... 98	1-0 p.m.	Day duty.
23/2/34	... 110	12 noon.	Day duty.
24/2/34	... 102	11-30a.m.	Day duty.
		M.P. ...	5/3/34.
20/3/34	... 110	10-15a.m.	Day duty.

} D.R.

CASE 23

NURSE.

Age— 17 years. *Menstruation commenced*— 14 years.

Duration— 4 days.

Abnormalities— Nil.

General Health— Good.

Date	Hb. %	Time	Remarks
24/7/33	... 94 ...	11-30a.m.	Day duty.
3/8/33	... 90 ...	1-0 p.m.	Day duty.
		M.P. ...	commenced 3/8/33, after test.
4/8/33	... 96 ...	1-0 p.m.	Day duty.
18/8/33	... 104 ...	12-30p.m.	Day duty.

LEFT.

CASE 24

NURSE.

Age— 25 years. *Menstruation commenced*— 14 years.

Duration— 3 days.

Abnormalities— Nil.

General Health— Good.

Date	Hb. %	Time	Remarks
		M.P. ...	24/11/33.
8/12/33	... 96 ...	9-30a.m.	Day duty.
19/12/33	... 98 ...	8-50a.m.	Night duty.
21/12/33	... 102 ...	9-0 a.m.	Night duty.
		M.P. ...	22/12/33.
5/1/34	... 102 ...	9-0 a.m.	Night duty.
16/1/34	... 102 ...	12-15p.m.	Day duty.
17/1/34	... 110 ...	8-45a.m.	Day duty.
18/1/34	... 102 ...	9-50a.m.	Day duty.
19/1/34	... 100 ...	8-50a.m.	Day duty.
20/1/34	... 108 ...	8-50a.m.	Day duty.
		M.P. ...	21/1/34—a.m.
5/2/34	... 110 ...	8-45a.m.	Day duty.
16/2/34	... 98 ...	10-15a.m.	Day duty.
17/2/34	... 100 ...	9-0 a.m.	Day duty.
19/2/34	... 106 ...	9-0 a.m.	Day duty.
		M.P. ...	19/2/34.
5/3/34	... 104 ...	2-15p.m.	Day duty.
16/3/34	... 106 ...	2-30p.m.	Day duty.
17/3/34	... 102 ...	12-30p.m.	Day duty.
19/3/34	... 110 ...	2-30p.m.	Day duty.
		M.P. ...	20/3/34.

CASE 25

NURSE.

Age— 23 years. *Menstruation commenced*— 15 years.

Duration— 7 days.

Abnormalities— Dysmenorrhoea; always vomiting;
occasionally 5 weeks period.

General Health— No serious illnesses.

Date	Hb. %	Time	Remarks
3/8/33	... 76 ...	9-30a.m.	Night duty.
17/8/33	... 86 ...	9-30a.m.	Night duty.
		M.P. ...	18/8/33.
12/9/33	... 94 ...	9-30a.m.	Night duty.
13/9/33	... 92 ...	9-30a.m.	Night duty.
14/9/33	... 92 ...	9-30a.m.	Night duty.
		M.P. ...	15/9/33—8 a.m.
29/9/33	... 86 ...	9-30a.m.	Night duty.
10/10/33	... 84 ...	9-0 a.m.	Night duty.
11/10/33	... 80 ...	9-0 a.m.	Night duty.
12/10/33	... 74 ...	9-0 a.m.	Night duty.
13/10/33	... 72 ...	9-15a.m.	Night duty.
		M.P. ...	23/10/33—4 a.m.
6/11/33	... 66 ...	9-30a.m.	Night duty.
17/11/33	... 66 ...	9-45a.m.	Night duty.
18/11/33	... 72 ...	10-0 a.m.	Night duty.
20/11/33	... 80 ...	9-15a.m.	Day duty commenced.
21/11/33	... 74 ...	9-15a.m.	Day duty.
22/11/33	... 68 ...	9-45a.m.	Day duty.
23/11/33	... 68 ...	9-30a.m.	Day duty.
		M.P. ...	27/11/33.
11/12/33	... 74 ...	9-0 a.m.	Day duty.
28/12/33	... 74 ...	9-45a.m.	Day duty.
29/12/33	... 70 ...	9-30a.m.	Day duty.
30/12/33	... 72 ...	9-15a.m.	Day duty.
		M.P. ...	2/1/34—early a.m.
17/1/34	... 74 ...	9-0 a.m.	Day duty.
		M.P. ...	29/1/34.
12/2/34	... 78 ...	9-15a.m.	Day duty.
13/2/34	... 76 ...	9-30a.m.	Day duty.
14/2/34	... 64 ...	9-0 a.m.	Day duty.
15/2/34	... 72 ...	9-45a.m.	Day duty.
16/2/34	... 78 ...	9-15a.m.	Day duty.
17/2/34	... 72 ...	9-30a.m.	Day duty.
		M.P. ...	3/3/34.
17/3/34	... 70 ...	9-30a.m.	Day duty.

} D.R.

CASE 26

HEALTH VISITOR.

Age— 39 years. *Menstruation commenced*— 14 years.

Duration— 5 days.

Abnormalities— Nil.

General Health— Good.

Date	Hb. %	Time	Remarks
3/8/33	... 86 ...	12 noon.	
		M.P. ...	4/8/33.
19/8/33	... 96 ...	10-0 a.m.	
		M.P. ...	4/9/33.
		M.P. ...	2/10/33.
16/10/33	... 90 ...	4-0 p.m.	
Observations discontinued—patient developed gastritis.			

CASE 27

NURSE.

Age— 30 years. *Menstruation commenced*— 14 years.

Duration— 4 days.

Abnormalities— Nil.

General Health— Good.

Date	Hb. %	Time	Remarks
		M.P. ...	18/10/33.
		M.P. ...	15/11/33.
29/11/33 ...	100 ...	9-0 a.m.	Day duty.
9/12/33 ...	92 ...	9-0 a.m.	Day duty.
		M.P. ...	11/12/33—early a.m.
27/12/33 ...	98 ...	8-50a.m.	Day duty.
5/1/34 ...	96 ...	8-50a.m.	Night duty.
6/1/34 ...	94 ...	8-30a.m.	Night duty.
		M.P. ...	7/1/34.
19/1/34 ...	94 ...	9-0 a.m.	Night duty.
		M.P. ...	31/1/34.
12/2/34 ...	110 ...	12-30p.m.	Night duty.
13/2/34 ...	96 ...	12-30p.m.	Night duty.
14/2/34 ...	112 ...	12 noon.	Night duty.
15/2/34 ...	106 ...	12 noon.	Night duty.
17/2/34 ...	106 ...	12-15p.m.	Night duty.
		M.P. ...	27/2/34.
13/3/34 ...	102 ...	9-0 a.m.	Night duty.
23/3/34 ...	104 ...	8-45a.m.	Night duty.
24/3/34 ...	100 ...	8-40a.m.	Night duty.
26/3/34 ...	100 ...	8-50a.m.	Night duty.

D.R.

CASE 28

NURSE.

Age— 18 years. *Menstruation commenced*— 12 years.

Duration— 4 days.

Abnormalities— No dysmenorrhoea.

General Health— No illnesses.

Date	Hb. %	Time	Remarks
14/8/33	98	9-0 a.m.	Day duty.
		M.P. ...	17/8/33.
11/9/33	98	9-30a.m.	Day duty.
12/9/33	102	9-45a.m.	Day duty.
13/9/33	106	9-15a.m.	Day duty.
		M.P. ...	13/9/33—8-30 p.m.
27/9/33	98	9-30a.m.	Day duty.
6/10/33	90	9-45a.m.	Day duty.
7/10/33	102	9-45a.m.	Day duty.
9/10/33	92	9-30a.m.	Day duty.
		M.P. ...	9/10/33—6-0 p.m.
23/10/33	92	9-15a.m.	Day duty.
1/11/33	94	9-30a.m.	Day duty.
2/11/33	96	9-45a.m.	Day duty.
3/11/33	94	10-0 a.m.	Day duty.
		M.P. ...	4/11/33—6-30 a.m.
18/11/33	100	9-45a.m.	Day duty.
27/11/33	88	9-30a.m.	Day duty.
28/11/33	102	9-30a.m.	Day duty.
29/11/33	96	9-30a.m.	Day duty.
30/11/33	98	9-45a.m.	Day duty.
		M.P. ...	30/11/33—6-0 p.m.
14/12/33	102	9-0 a.m.	Day duty.
		M.P. ...	24/12/33.
8/1/34	96	9-15a.m.	Day duty. Has a day off.
9/1/34	90	9-15a.m.	Day duty.
10/1/34	100	9-30a.m.	Day duty.
11/1/34	94	9-30a.m.	Day duty.
12/1/34	98	9-30a.m.	Day duty.
13/1/34	92	9-30a.m.	Day duty.
		M.P. ...	19/1/34—9-0 p.m.
3/2/34	92	9-30a.m.	Day duty.
		M.P. ...	14/2/34.
28/2/34	104	9-30a.m.	Day duty.
		M.P. ...	10/3/34.
26/3/34	98	9-30a.m.	Day duty.

CASE 29

HEALTH VISITOR.

Age— 32 years. *Menstruation commenced*— 18 years.

Duration— 3 days.

Abnormalities— Dysmenorrhoea 1st 4 hours.

General Health— No illnesses.

Date	Hb. %	Time	Remarks
		M.P. ...	1/9/33.
15/9/33	... 108	... 12 noon.	
23/9/33	... 102	... 12 noon.	
25/9/33	... 102	... 2-3op.m.	
26/9/33	... 92	... 4-3op.m.	
		M.P. ...	27/9/33.
10/10/33	... 94	... 2-3op.m.	
20/10/33	... 90	... 4-3op.m.	
21/10/33	... 88	... 12 noon.	
23/10/33	... 98	... 4-3op.m.	
24/10/33	... 94	... 2-3op.m.	
		M.P. ...	24/10/33—11-0 p.m.
7/11/33	... 94	... 2-3op.m.	
17/11/33	... 90	... 5-0 p.m.	
18/11/33	... 100	... 12-3op.m.	
		M.P. ...	19/11/33—5-0 p.m.
4/12/33	... 96	... 5-0 p.m.	
		M.P. ...	10/12/33—a.m.
		M.P. ...	30/12/33—a.m.
17/1/34	... 102	... 4-3op.m.	
18/1/34	... 104	... 12 noon.	
19/1/34	... 100	... 4-3op.m.	
20/1/34	... 96	... 12-3op.m.	
22/1/34	... 98	... 2-3op.m.	
23/1/34	... 102	... 4-3op.m.	
		M.P. ...	23/1/34—p.m.
5/2/34	... 104	... 12-3op.m.	} D.R.
6/2/34	... 106	... 12-3op.m.	
7/2/34	... 106	... 12 noon.	
8/2/34	... 112	... 12-15p.m.	
10/2/34	... 104	... 12-15p.m.	
		M.P. ...	19/2/34.
7/3/34	... 102	... 12 noon.	

CASE 30

DAY SISTER.

Age— 31 years. Menstruation commenced— 12 years.

Duration— 4 days.

Abnormalities— No dysmenorrhoea.

General Health— Scarlet fever at 22 years.

Date	Hb. %	Time	Remarks
		M.P. ...	28/8/33.
		M.P. ...	22/9/33.
6/10/33	... 100	... 9-30a.m.	Day duty all the time.
13/10/33	... 98	... 9-30a.m.	
14/10/33	... 104	... 9-45a.m.	
16/10/33	... 100	... 9-45a.m.	
		M.P. ...	16/10/33—1-0 p.m.
26/10/33	... 98	... 9-30a.m.	
6/11/33	... 104	... 9-15a.m.	
7/11/33	... 106	... 9-0 a.m.	
8/11/33	... 94	... 9-30a.m.	
9/11/33	... 90	... 9-15a.m.	
10/11/33	... 106	... 9-30a.m.	
		M.P. ...	10/11/33—1-0 p.m.
22/11/33	... 100	... 9-15a.m.	
2/12/33	... 108	... 9-0 a.m.	
4/12/33	... 94	... 9-15a.m.	
5/12/33	... 102	... 9-15a.m.	
		M.P. ...	6/12/33—early a.m.
18/12/33	... 104	... 9-15a.m.	
28/12/33	... 100	... 9-30a.m.	
29/12/33	... 102	... 9-0 a.m.	
30/12/33	... 106	... 9-15a.m.	
2/1/34	... 100	... 9-15a.m.	
		M.P. ...	2/1/34—1-0 p.m.
15/1/34	... 104	... 9-15a.m.	} D.R.
16/1/34	... 104	... 9-15a.m.	
17/1/34	... 106	... 9-15a.m.	
18/1/34	... 102	... 9-0 a.m.	
19/1/34	... 108	... 9-30a.m.	
20/1/34	... 102	... 9-0 a.m.	
		M.P. ...	27/1/34.
10/2/34	... 98	... 9-30a.m.	
		M.P. ...	20/2/34.
6/3/34	... 100	... 9-45a.m.	
		M.P. ...	17/3/34.

CASE 31

NURSE.

Age— 19 years. *Menstruation commenced*— 13 years.

Duration— 4 days.

Abnormalities— Nil.

General Health— Good.

Date	Hb. %	Time	Remarks
		M.P. ...	20/9/33.
5/10/33	110	10-0 a.m.	Day duty.
14/10/33	100	10-0 a.m.	Day duty.
16/10/33	108	10-0 a.m.	Day duty.
17/10/33	104	9-30a.m.	Day duty.
18/10/33	96	9-30a.m.	Day duty.
19/10/33	102	9-30a.m.	Day duty.
20/10/33	96	9-45a.m.	Day duty.
		M.P. ...	21/10/33.
4/11/33	96	10-0 a.m.	Day duty.
		M.P. ...	16/11/33—5-0 p.m.
30/11/33	102	10-0 a.m.	Day duty.

LEFT.

CASE 32

NURSE.

Age— 27 years. *Menstruation commenced*— 15 years.

Duration— 4 days.

Abnormalities— Occasional dysmenorrhoea.

General Health— Appendicitis at 18 years.

Date	Hb. %	Time	Remarks
		M.P. ...	8/9/33.
23/9/33	... 100 ...	9-30a.m.	Day duty.
3/10/33	... 112 ...	9-30a.m.	Night duty.
4/10/33	... 106 ...	9-30a.m.	Night duty.
5/10/33	... 100 ...	9-45a.m.	Night duty.
		M.P. ...	6/10/33—a.m.
20/10/33	... 98 ...	9-45a.m.	Night duty.
31/10/33	... 100 ...	9-15a.m.	Night duty.
1/11/33	... 102 ...	9-45a.m.	Night duty.
2/11/33	... 98 ...	9-30a.m.	Night duty.
3/11/33	... 112 ...	9-45a.m.	Night duty.
4/11/33	... 100 ...	9-45a.m.	Night duty.
		M.P. ...	5/11/33—5-0 a.m.
20/11/33	... 92 ...	9-0 a.m.	Night duty.
30/11/33	... 98 ...	9-15a.m.	Night duty.
1/12/33	... 102 ...	9-15a.m.	Night duty.
2/12/33	... 100 ...	9-30a.m.	Night duty.
		M.P. ...	3/12/33—3-0 a.m.
19/12/33	... 98 ...	9-30a.m.	Night duty.
		M.P. ...	30/12/33.
			(Has been ill with sore throat).
13/1/34	... 102 ...	9-15a.m.	Day duty.
24/1/34	... 94 ...	9-15a.m.	Day duty.
25/1/34	... 106 ...	9-15a.m.	Day duty.
		M.P. ...	26/1/34—8-0 a.m.
12/2/34	... 104 ...	9-30a.m.	Day duty.
13/2/34	... 102 ...	9-15a.m.	Day duty.
14/2/34	... 104 ...	9-15a.m.	Day duty.
15/2/34	... 100 ...	9-30a.m.	Day duty.
16/2/34	... 108 ...	9-30a.m.	Day duty.
17/2/34	... 102 ...	9-30a.m.	Day duty.
		M.P. ...	22/2/34—1-0 p.m.
8/3/34	... 108 ...	10-0 a.m.	
		M.P. ...	17/3/34.

CASE 33

NURSE.

Age— 18 years. *Menstruation commenced*— 13 years.

Duration— 4 days.

Abnormalities— No malaise except occasional headache.

General Health— Measles and whooping cough in childhood.

Did household duties at home until entered Hospital, 18/9/33.

Date	Hb. %	Time	Remarks
5/10/33	... 96 ...	9-45a.m.	Day duty.
16/10/33	... 100 ...	10-0 a.m.	Day duty.
17/10/33	... 96 ...	9-45a.m.	Day duty.
18/10/33	... 94 ...	9-45a.m.	Day duty.
19/10/33	... 96 ...	9-45a.m.	Day duty.
20/10/33	... 94 ...	9-45a.m.	Day duty.
21/10/33	... 94 ...	9-45a.m.	Day duty.
23/10/33	... 94 ...	9-30a.m.	Day duty.
24/10/33	... 94 ...	9-15a.m.	Day duty.
25/10/33	... 90 ...	9-15a.m.	Day duty.
26/10/33	... 92 ...	9-45a.m.	Day duty.
		M.P. ...	27/10/33—lasted 2 days. Recommended 3/11/33—1 day.
13/11/33	... 96 ...	9-30a.m.	Day duty.
22/11/33	... 90 ...	9-45a.m.	Day duty.
23/11/33	... 98 ...	9-30a.m.	Day duty.
		M.P. ...	23/11/33—9-30 p.m.
7/12/33	... 92 ...	9-30a.m.	Day duty.
16/12/33	... 90 ...	9-30a.m.	Day duty.
18/12/33	... 98 ...	9-30a.m.	Day duty.
19/12/33	... 102 ...	9-30a.m.	Day duty.
20/12/33	... 98 ...	9-45a.m.	Day duty.
21/12/33	... 96 ...	9-30a.m.	Day duty.
			Had a sore throat last week.
		M.P. ...	22/12/33.
5/1/34	... 86 ...	9-30a.m.	Day duty. Has a cold.
		M.P. ...	11/1/34—p.m.
25/1/34	... 98 ...	9-30a.m.	Day duty.
5/2/34	... 98 ...	9-45a.m.	Day duty.
		M.P. ...	5/2/34—noon.
19/2/34	... 96 ...	9-45a.m.	Day duty.
28/2/34	... 100 ...	9-30a.m.	Day duty.
1/3/34	... 102 ...	1-0 p.m.	Day duty.
		M.P. ...	1/3/34—later.
15/3/34	... 94 ...	1-0 p.m.	Day duty.
		M.P. ...	25/3/34.

CASE 34

NURSE.

Age— 21 years. *Menstruation commenced*— 15 years.

Duration— 3 days.

Abnormalities— Premenstrual dysmenorrhoea every second period.

General Health— Measles and scarlet fever in childhood.

Date	Hb. %	Time	Remarks
		M.P. ...	18/9/33.
2/10/33	104	9-30a.m.	Day duty.
12/10/33	102	9-30a.m.	Day duty.
13/10/33	100	9-30a.m.	Day duty.
14/10/33	102	10-0 a.m.	Day duty. No dysmenorrhoea.
		M.P. ...	16/10/33—7-30 a.m.—lasted 2 days 2 days discharge 25th and 26th Oct. Happened occasionally before.
30/10/33	94	9-15a.m.	Day duty.
9/11/33	96	9-30a.m.	Day duty.
10/11/33	104	9-45a.m.	Day duty. Had earache.
11/11/33	96	9-30a.m.	Day duty. Has had a cold.
13/11/33	94	9-15a.m.	Day duty.
		M.P. ...	15/11/33—8-30 a.m.
29/11/33	96	9-45a.m.	Day duty.
9/12/33	94	9-45a.m.	Day duty.
11/12/33	100	9-45a.m.	Day duty.
12/12/33	96	9-0 a.m.	Day duty.
13/12/33	92	9-15a.m.	Day duty. Has a cold.
14/12/33	96	9-0 a.m.	Day duty.
		M.P. ...	15/12/33—7 a.m.
29/12/33	90	9-45a.m.	Day duty.
		M.P. ...	9/1/34.
23/1/34	90	9-30a.m.	Day duty.
5/2/34	94	2-0 p.m.	Day duty.
6/2/34	98	2-0 p.m.	Day duty.
		M.P. ...	7/2/34.
LEFT.			

CASE 35

NURSE.

Age— 29 years. Menstruation commenced— 13 years.

Duration— 3 days.

Abnormalities— Nil.

General Health— Good.

Date	Hb. %	Time	Remarks
		M.P. ...	10/9/33.
6/10/33	... 100	... 9-0 a.m.	Day duty.
		M.P. ...	7/10/33.
21/10/33	... 104	... 9-0 a.m.	Day duty.
31/10/33	... 106	... 8-0 p.m.	Day duty.
1/11/33	... 100	... 11-30a.m.	Day duty.
2/11/33	... 106	... 11-0 a.m.	Day duty.
3/11/33	... 102	... 6-30p.m.	Day duty.
		M.P. ...	4/11/33.
18/11/33	... 104	... 12-30p.m.	Day duty.
29/11/33	... 106	... 9-0 a.m.	Day duty.
30/11/33	... 100	... 9-0 a.m.	Day duty.
1/12/33	... 106	... 9-0 a.m.	Day duty.
2/12/33	... 110	... 10-30a.m.	Day duty.
		M.P. ...	3/12/33.
16/12/33	... 114	... 9-0 a.m.	Day duty.
		M.P. ...	27/12/33.

LEFT.

CASE 36

NURSE.

Age— 25 years. Menstruation commenced— 14 years.

Duration— 6 days.

Abnormalities— No dysmenorrhoea.

General Health— No illnesses.

Date	Hb. %	Time	Remarks
		M.P. ...	8/9/33.
2/10/33	... 108 ...	8-45a.m.	Night duty.
3/10/33	... 106 ...	8-45a.m.	Night duty.
4/10/33	... 100 ...	8-45a.m.	Night duty.
5/10/33	... 94 ...	8-45a.m.	Night duty.
6/10/33	... 96 ...	8-45a.m.	Night duty.
		M.P. ...	7/10/33.
21/10/33	... 102 ...	8-45a.m.	Night duty.
		M.P. ...	31/10/33.
14/11/33	... 102 ...	8-45a.m.	Day duty.
22/11/33	... 96 ...	8-45a.m.	Day duty.
23/11/33	... 96 ...	8-45a.m.	Day duty.
24/11/33	... 88 ...	8-45a.m.	Day duty.
25/11/33	... 94 ...	8-55a.m.	Day duty.
		M.P. ...	26/11/33—p.m.
9/12/33	... 92 ...	12 noon.	On district.
18/12/33	... 98 ...	2-30p.m.	On district.
19/12/33	... 94 ...	2-0 p.m.	On district.
20/12/33	... 100 ...	12 noon.	On district.
		M.P. ...	21/12/33.
4/1/34	... 102 ...	8-55a.m.	On district.

LEFT.

HEAD

CASE 37

NURSE.

Age— 29 years. Menstruation commenced— 14 years.

Duration— 3 days.

Abnormalities— Nil.

General Health— Good.

Date	Hb. %	Time	Remarks
		M.P. ...	26/9/33.
24/10/33	94	9-0 a.m.	Night duty.
25/10/33	94	9-0 a.m.	Night duty.
26/10/33	100	9-0 a.m.	Night duty.
		M.P. ...	27/10/33.
10/11/33	92	9-0 a.m.	Night duty.
23/11/33	98	8-45a.m.	Day duty.
24/11/33	100	8-45a.m.	Day duty.
25/11/33	100	8-45a.m.	Day duty.
		M.P. ...	25/11/33—p.m.
9/12/33	92	9-0 a.m.	Day duty.
22/12/33	104	8-45a.m.	Day duty.
23/12/33	104	9-15a.m.	Day duty.
		M.P. ...	25/12/33—a.m.

LEFT.

CASE 38

NIGHT SISTER.

Age— 31 years. *Menstruation commenced*— 13 years.

Duration— 3—4 days.

Abnormalities— No dysmenorrhoea.

General Health— No illnesses.

Date	Hb. %	Time	Remarks
		M.P. ...	14/9/33.
13/10/33	... 104	... 9-0 a.m.	Night duty all the time.
14/10/33	... 102	... 9-0 a.m.	
16/10/33	... 102	... 9-0 a.m.	
17/10/33	... 104	... 9-0 a.m.	
18/10/33	... 96	... 8-45a.m.	
19/10/33	... 102	... 8-15a.m.	
20/10/33	... 94	... 8-45a.m.	
21/10/33	... 94	... 8-30a.m.	
		M.P. ...	23/10/33—a.m.
8/11/33	... 100	... 9-0 a.m.	
21/11/33	... 100	... 8-45a.m.	
22/11/33	... 104	... 8-45a.m.	
		M.P. ...	23/11/33—2 a.m.
9/12/33	... 96	... 9-0 a.m.	
21/12/33	... 102	... 9-0 a.m.	
22/12/33	... 106	... 9-0 a.m.	
23/12/33	... 100	... 9-0 a.m.	
		M.P. ...	24/12/33—p.m.
8/1/34	... 102	... 8-30a.m.	
22/1/34	... 102	... 9-0 a.m.	
23/1/34	... 102	... 8-45a.m.	
24/1/34	... 94	... 9-15a.m.	
		M.P. ...	25/1/34.
5/2/34	... 110	... 8-50a.m.	} D.R.
6/2/34	... 104	... 8-50a.m.	
7/2/34	... 98	... 8-50a.m.	
8/2/34	... 102	... 8-50a.m.	
9/2/34	... 100	... 9-0 a.m.	
10/2/34	... 106	... 9-0 a.m.	
		M.P. ...	1/3/34.
14/3/34	... 106	... 9-0 a.m.	

CASE 39

DAY SISTER.

Age—34 years. *Menstruation commenced*—16 years.

Duration—3 days full—7 days scanty.

Abnormalities—Premenstrual Dysmenorrhoea.

General Health—No illnesses.

Date	Hb. %	Time	Remarks
12/10/33	... 110	9-0 a.m.	Day duty all the time.
13/10/33	... 104	8-45a.m.	
14/10/33	... 102	12-30p.m. M.P. ...	
26/10/33	... 102	9-0 a.m.	14/10/33—2 p.m.
6/11/33	... 100	8-45a.m.	
7/11/33	... 92	10-0 a.m.	
8/11/33	... 104	8-45a.m.	
9/11/33	... 96	8-45a.m.	
10/11/33	... 102	8-45a.m.	
11/11/33	... 88	8-45a.m. M.P. ...	12/11/33.
26/11/33	... 96	9-0 a.m.	
5/12/33	... 106	12 noon.	
6/12/33	... 108	8-45a.m.	
7/12/33	... 96	8-45a.m.	
8/12/33	... 92	9-0 a.m. M.P. ...	10/12/33—early a.m.
27/12/33	... 102	8-45a.m.	
4/1/34	... 98	8-40a.m.	
5/1/34	... 98	9-0 a.m. M.P. ...	5/1/34.
		M.P. ...	2/2/34.
		M.P. ...	28/2/34.
12/3/34	... 102	9-0 a.m.	} D.R.
13/3/34	... 106	9-0 a.m.	
14/3/34	... 106	9-10a.m.	
15/3/34	... 100	9-0 a.m.	
16/3/34	... 108	9-0 a.m.	

CASE 40

STAFF NURSE.

Age— 26 years. Menstruation commenced— 16 years.

Duration— 5 days.

Abnormalities— Occasional premenstrual dysmenorrhoea.

General Health— Pneumonia in childhood; tonsils removed.

Date	Hb. %	Time	Remarks
		M.P. ...	21/9/33.
6/10/33 ...	86 ...	9-15a.m.	Day duty.
19/10/33 ...	96 ...	8-30a.m.	Day duty.
20/10/33 ...	90 ...	8-30a.m.	Day duty.
21/10/33 ...	94 ...	9-0 a.m.	Day duty.
		M.P. ...	22/10/33—a.m.
4/11/33 ...	94 ...	11-0 a.m.	Day duty.
18/11/33 ...	96 ...	8-45a. m.	Day duty.
		M.P. ...	20/11/33—a.m.
5/12/33 ...	98 ...	11-30a.m.	Day duty.
16/12/33 ...	104 ...	8-45a.m.	Night duty.
18/12/33 ...	102 ...	8-45a.m.	Day duty.
		M.P. ...	19/12/33.
2/1/34 ...	94 ...	11-30a.m.	Day duty.
13/1/34 ...	102 ...	10-0 a.m.	Day duty.
15/1/34 ...	98 ...	8-50a.m.	Day duty.
16/1/34 ...	96 ...	12-30p.m.	Day duty.
17/1/34 ...	100 ...	8-55a.m.	Day duty.
18/1/34 ...	98 ...	10-0 a.m.	Day duty.
19/1/34 ...	104 ...	8-50a.m.	Day duty.
20/1/34 ...	100 ...	8-45a.m.	Day duty.
		M.P. ...	22/1/34—early a.m.
5/2/34 ...	108 ...	8-30a.m.	Day duty.
16/2/34 ...	106 ...	10-0 a.m.	Day duty.
17/2/34 ...	112 ...	9-0 a.m.	Day duty.
19/2/34 ...	102 ...	9-0 a.m.	Day duty.
21/2/34 ...	100 ...	9-0 a.m.	Day duty.
23/2/34 ...	94 ...	9-0 a.m.	Day duty.
24/2/34 ...	108 ...	9-0 a.m.	Night duty.
		M.P. ...	24/2/34.
5/3/34 ...	98 ...	10-15a.m.	Night duty.
6/3/34 ...	96 ...	12 noon.	Night duty.
7/3/34 ...	98 ...	9-50a.m.	Night duty.
8/3/34 ...	102 ...	9-50a.m.	Night duty.
9/3/34 ...	102 ...	9-50a.m.	Night duty.
10/3/34 ...	112 ...	9-0 a.m.	Night duty.

D.R.

CASE 41

NURSE.

Age— 21 years. *Menstruation commenced*— 16 years.

Duration— 3 days.

Abnormalities— No Dysmenorrhoea.

General Health— No serious illnesses.

Date	Hb. %	Time	Remarks
		M.P. ...	3/10/33.
19/10/33 ...	104 ...	9-0 a.m.	Night duty.
31/10/33 ...	102 ...	9-0 a.m.	Night duty.
1/11/33 ...	98 ...	9-0 a.m.	Night duty.
2/11/33 ...	104 ...	9-0 a.m.	Night duty.
3/11/33 ...	108 ...	9-0 a.m.	Night duty.
4/11/33 ...	106 ...	9-0 a.m.	Night duty. Had septic finger.
		M.P. ...	9/11/33.
25/11/33 ...	102 ...	11-45 a.m.	Day duty.
		M.P. ...	6/12/33.
20/12/33 ...	106 ...	2-0 p.m.	Day duty.
2/1/34 ...	94 ...	2-0 p.m.	Night duty.
4/1/34 ...	102 ...	9-0 a.m.	Night duty.
		M.P. ...	4/1/34.
18/1/34 ...	104 ...	8-30 a.m.	Night duty.
1/2/34 ...	110 ...	1-0 p.m.	Day duty.
2/2/34 ...	110 ...	1-0 p.m.	Day duty.
3/2/34 ...	114 ...	12 noon.	Day duty.
		M.P. ...	4/2/34.
15/2/34 ...	104 ...	1-0 p.m.	Day duty.
2/3/34 ...	108 ...	9-0 a.m.	Night duty.
3/3/34 ...	110 ...	9-0 a.m.	Night duty.
5/3/34 ...	114 ...	9-0 a.m.	Night duty.
6/3/34 ...	106 ...	9-0 a.m.	Night duty.
7/3/34 ...	108 ...	9-0 a.m.	Night duty.
8/3/34 ...	116 ...	9-0 a.m.	Night duty.
		M.P. ...	9/3/34.
22/3/34 ...	116 ...	9-0 a.m.	Night duty.

CASE 42

NURSE.

Age— 21 years. *Menstruation commenced*— 14 years.

Duration— 3 days.

Abnormalities— Dysmenorrhoea 1st day.

General Health— Diphtheria badly at age 19; tonsils removed one month before commenced hospital duty—home one month.

Date	Hb. %	Time	Remarks
		M.P. ...	7/10/33.
3/11/33	... 108	... 10-0 a.m.	Day duty.
4/11/33	... 108	... 10-0 a.m.	Day duty.
6/11/33	... 96	... 9-30a.m.	Day duty.
7/11/33	... 100	... 9-30a.m.	Day duty.
8/11/33	... 100	... 9-30a.m.	Day duty.
9/11/33	... 104	... 9-30a.m.	Day duty.
10/11/33	... 98	... 9-30a.m.	Day duty.
11/11/33	... 102	... 9-30a.m.	Day duty.
13/11/33	... 96	... 9-15a.m.	Day duty.
		M.P. ...	16/11/33.
30/11/33	... 102	... 10-0 a.m.	Day duty.
		M.P. ...	12/12/33.
27/12/33	... 106	... 9-45a.m.	Day duty.
5/1/34	... 100	... 9-30a.m.	Day duty.
6/1/34	... 94	... 9-15a.m.	Day duty.
		M.P. ...	7/1/34—a.m.
20/1/34	... 98	... 9-45a.m.	Day duty.
31/1/34	... 102	... 9-30a.m.	Day duty.
1/2/34	... 106	... 9-30a.m.	Day duty.
2/2/34	... 108	... 9-30a.m.	Day duty.
3/2/34	... 112	... 9-30a.m.	Day duty.
5/2/34	... 100	... 9-30a.m.	Day duty.
		M.P. ...	6/2/34—7-0 a.m.
20/2/34	... 102	... 2-0 p.m.	Day duty.
		M.P. ...	1/3/34.
15/3/34	... 104	... 1-0 p.m.	Night duty.
		M.P. ...	25/3/34.

CASE 43

NURSE.

Age— 23 years. *Menstruation commenced*—14 years.

Duration— 3 days.

Abnormalities— Nil.

General Health— Scarlet fever in childhood.

Date	Hb. %	Time	Remarks
		M.P. ...	20/10/33.
4/11/33	... 100 ...	11-0 a.m.	Day duty.
16/11/33	... 100 ...	8-45a.m.	Night duty.
		M.P. ...	17/11/33.
1/12/33	... 98 ...	8-45a.m.	Night duty.
		M.P. ...	11/12/33.
23/12/33	... 108 ...	9-30a.m.	Day duty.
		M.P. ...	3/1/34—a.m.
15/1/34	... 94 ...	8-50a.m.	Day duty.
24/1/34	... 102 ...	8-55a.m.	Day duty.
25/1/34	... 110 ...	8-55a.m.	Day duty.
26/1/34	... 98 ...	10-0 a.m.	Day duty.
		M.P. ...	27/1/34.
12/2/34	... 114 ...	12-30p.m.	Day duty.
13/2/34	... 108 ...	12-30p.m.	Day duty.
15/2/34	... 104 ...	12-15p.m.	Day duty.
17/2/34	... 108 ...	12-15p.m.	Day duty.
		M.P. ...	22/2/34.
8/3/34	... 108 ...	9-40a.m.	Day duty.
16/3/34	... 112 ...	9-5 a.m.	Day duty.
17/3/34	... 104 ...	9-0 a.m.	Day duty.
		M.P. ...	18/3/34.

CASE 44

TUBERCULAR PATIENT.

Age— 20 years. *Menstruation commenced*— 14 years.

Duration— 5 days.

Abnormalities— No pain; regular until onset of present illness.

General Health— Notified T.B. lungs.

Date	Hb. %	Time	Remarks
		M.P. ...	30/10/33.
11/11/33	92	11-0 a.m.	
23/11/33	94	2-0 p.m.	
		M.P. ...	25/11/33—a.m.
9/12/33	90	11-30a.m.	
20/12/33	82	2-0 p.m.	
21/12/33	90	12-30p.m.	
		M.P. ...	22/12/33.
5/1/34	84	1-30p.m.	
16/1/34	90	1-30p.m.	
18/1/34	86	1-30p.m.	
		M.P. ...	19/1/34—a.m.
2/2/34	84	2-0 p.m.	
13/2/34	86	2-0 p.m.	
14/2/34	84	2-0 p.m.	
15/2/34	100	1-0 p.m.	
		M.P. ...	18/2/34.
2/3/34	94	9-0 a.m.	
15/3/34	90	1-0 p.m.	
16/3/34	92	4-30p.m.	
17/3/34	92	12 noon.	
		M.P. ...	19/3/34.

CASE 45

TUBERCULAR PATIENT.

Age— 20 years. *Menstruation commenced*— 16 years.

Duration— 3 days.

Abnormalities— Regular until onset of present illness—no pain.

General Health— Notified T.B. lungs.

Date	Hb. %	Time	Remarks
		M.P. ...	11/10/33.
4/11/33	86	9-0 a.m.	
6/11/33	84	10-30a.m.	
7/11/33	84	4-30p.m.	
8/11/33	74	1-0 p.m.	
		M.P. ...	9/11/33.
23/11/33	86	2-0 p.m.	
4/12/33	82	10-0 a.m.	
5/12/33	82	2-0 p.m.	
		M.P. ...	6/12/33.
20/12/33	74	2-0 p.m.	
2/1/34	68	2-30p.m.	
3/1/34	80	2-0 p.m.	
4/1/34	74	9-30a.m.	
		M.P. ...	5/1/34.
18/1/34	76	9-0 a.m.	
31/1/34	76	2-0 p.m.	
1/2/34	80	1-0 p.m.	
2/2/34	78	2-0 p.m.	
		M.P. ...	7/2/34.
22/2/34	76	1-0 p.m.	
		M.P. ...	5/3/34.
20/3/34	78	10-15a.m.	

APPENDIX F.

DETAILED RECORDS OF 62 CASES IN GROUP B.

Number Para. Age	Age of Pregnancy in weeks	Haemoglobin values per cent.	Number Para. Age	Age of Pregnancy in weeks	Haemoglobin values per cent.
1	19	76	7	29	74
	23	88		36	96
2nd	27	76	2nd	...	...
	31	72		...	...
21 years	35	76	22 years	...	...
2	34	76	8	22	80
	38	74		26	88
4th	...	...	1st	30	78
	...	...		34	96
23 years	...	...	22 years	38	104
3	30	80	9	35	84
	34	84		39	88
1st	38	70	1st	...	...

29 years	...	...	20 years	...	...
4	19	64	10	13	80
	24	60		17	92
2nd	30	48	2nd	32	92
	36	60		36	84
23 years	...	...	28 years	...	...
5	26	62	11	33	64
	30	76		37	70
1st	37	70	2nd	...	...

31 years	...	...	34 years	...	...
6	14	66	12	25	72
	18	78		29	86
4th	...	...	5th	35	80

28 years	...	...	41 years	...	...

APPENDIX F. (continued).

Number Para. Age	Age of Pregnancy in weeks	Haemoglobin values per cent.	Number Para. Age	Age of Pregnancy in weeks	Haemoglobin values per cent.
13	30	70	20	28	70
	34	86		33	62
1st	...	...	1st	...	...
17 years	...	...	26 years	...	...
14	24	74	21	21	90
	28	80		25	76
3rd	34	74	2nd	36	80
	39	96		40	70
26 years	...	...	26 years	...	...
15	29	98	22	28	92
	34	80	...	32	86
1st	39	98	4th	36	88

24 years	...	...	31 years	...	...
16	30	86		3	76
	34	90	23	7	70
1st	38	76		14	88
	...	...	3rd	20	78
19 years	...	...		24	84
			25 years	33	92
17	35	100	24	30	86
	39	96		34	86
3rd	...	...	1st	...	...

30 years	...	...	20 years	...	...
18	21	90	25	14	94
	25	84		18	82
1st	29	74	2nd	...	...
	36	82		...	...
30 years	...	...	27 years	...	...
19	32	64	26	20	84
	36	58		24	86
6th	40	54	5th	30	90

38 years	...	...	27 years	...	...

APPENDIX F. (continued).

Number Para. Age	Age of Pregnancy in weeks	Haemoglobin values per cent.	Number Para. Age	Age of Pregnancy in weeks	Haemoglobin values per cent.
27	25	72	34	25	88
	29	80		29	104
2nd	33	86	1st	...	...
	37	80		...	...
26 years	...	...	31 years	...	...
28	23	86		11	104
	29	102	35	15	100
1st	33	96	1st	19	100
	...	...		23	96
27 years	...	...	29 years	27	94
				33	102
29	23	80	36	27	84
	29	82		31	78
3rd	...	...	2nd	35	70
	...	...		37	72
28 years	...	...	30 years	...	...
30	27	90	37	23	88
	33	88		29	82
4th	37	86	1st	33	88
	...	...		40	96
26 years	...	...	24 years	...	...
31	32	88	38	20	96
	36	90		24	80
2nd	39	84	1st	28	84
	...	...		32	82
30 years	...	...	27 years	36	82
32	31	74	39	29	88
	38	72		33	80
2nd	...	...	5th	...	...

24 years	...	...	43 years	...	...
33	30	92	40	29	88
	34	84		36	94
1st	38	72	1st	...	...

21 years	...	...	20 years	...	...

APPENDIX F. (continued).

Number Para. Age	Age of Pregnancy in weeks	Haemoglobin values per cent.	Number Para. Age	Age of Pregnancy in weeks	Haemoglobin values per cent.
41	25	80	47	31	82
	31	82		36	82
1st	37	84	1st	...	...

26 years	...	...	24 years	...	...
42	32	84	48	27	74
	38	84		31	72
3rd	...	...	12th	36	74

26 years	...	...	38 years	...	...
43	22	68	49	34	58
	26	70		38	60
8th	30	72	2nd	39	62

35 years	...	...	23 years	...	...
44	12	76	50	28	90
	16	68	...	32	92
2nd	20	70	3rd	39	98
	26	72		...	...
29 years	30	72	32 years	...	...
45	30	68	51	26	84
	34	70		30	84
2nd	...	...	1st	38	100

22 years	...	...	22 years	...	...
46	36	102	52	31	80
	40	112		35	80
1st	...	...	2nd	...	...

21 years	...	...	20 years	...	...

APPENDIX F. (continued).

Number Para. Age	Age of Pregnancy in weeks	Haemoglobin values per cent.	Number Para. Age	Age of Pregnancy in weeks	Haemoglobin values per cent.
53	32	108	58	27	92
	36	102		31	94
2nd	...	...	1st	...	...

26 years	...	...	28 years	...	...
54	23	100	59	28	100
	27	110		32	108
2nd	31	114	5th	...	...

30 years	...	...	33 years	...	...
55	34	74	60	28	82
	38	80		32	76
1st	...	...	4th	...	...

19 years	...	...	31 years	...	...
56	12	102	61	21	94
	17	102		25	102
6th	21	98	2nd	...	...

29 years	...	...	25 years	...	...
57	23	78	62	29	88
	30	78		33	108
1st	...	...	8th	...	...

32 years	...	...	33 years	...	...

BIBLIOGRAPHY.

- (1) LUCEY: Pract., Lond., 1923, 110, 373-380.
- (2) PRICE JONES: J. Path. and Bact., 34, 779, 1931.
- (3) MACKAY: Nutritional Anaemia in Infancy, Medical Research Council.
- (4) DAVIDSON: British Med. Jour. 1933: Vol. I. Page 685: 22nd Ap.
- (5) SHORT: Newcastle Medical Journal: 2: 179-183: July, 1931.
- (6) NEWHAM, WILLSHIRE and SCHARFF: J. Royl. Army Med. Corps., London, 1924: 43: 359-365.
- (7) SENTY: J. Lab. and Clin. Med.: St. Louis: 1922-23: 8: 591-603.
- (8) OSGOOD and HASKINS: Arch. Int. Med: 1926: 37: 685: 1927: 39: 643.
- (9) WINTROBE and MILLER: Arch. Int. Med: 1929: 43: 96. 1930: 45: 287.
- (10) ORIAS: Compt. rend. Soc. de Biol. 105: 711-712: Dec. 12, 1930.
- (11) SOKHEY: Reports of Haffkine Inst. 1929: 26.
- (12) JENKINS and DON: J. Hygiene: 33: 36-41: Jan. 1933.
Brit. J. Exper. Path. 12: 212.
- (13) HALDANE: J. Physiol: 26: 502.
- (14) WILLIAMSON: Arch. Int. Med. 18: 505.
- (15) BLAND, FIRST and GOLDSTEIN: Am. J. Med. Sc. 179: 48 (1930).
- (16) NOVAK: Menstruation and Its Disorders: p.p. 92-93.
- (17) HAYIM: Cit. Novak (16).
- (18) REINL: Cit. Novak (16).
- (19) MERLETTI: Cit. Novak (16).
- (20) RICCA BARBARIS: Cit. Novak (16).
- (21) SFAMENI: Cit. Novak (16).
- (22) ROZZI: Cit. Novak (16).
- (23) BLUMENTHAL: Cit. Novak (16).
- (24) POLZL: Cit. Novak (16).
- (25) GUMPRICH: Beitr. Zur. Geburts. und Gynäk. 19: 1914: 435-460.
- (26) RUD: Act. Med. Scand: 57: 142: 1922-23.
- (27) DETRE: Ztsch. f. d. ges. exper. Med: 59: 240-247: 1928.
- (28) CARNOT and DEFLANDRE: Compt. rend. Soc. de Biol. Paris: 1909, 66: 71-74.
- (29) KRUTCHENKOFF: Recherches sur les variations des globules sanguin au cours de la menstruation. Paris 1909.
- (30) REICH and GREEN: Arch. Int. Med. 49: 534-538: March, 1932.
- (31) PINEY: Recent Advances in Haematology, page 180.
- (32) DAVIDOVITSCH: Cit. Reich and Green (30).

- (33) THOMPSON: Bull. John Hopkins Hosp. 15: 205: 1904.
- (34) FRIEDLANDER and WIDEMEYER: Arch. Int. Med. 44: 210: 1929.
- (35) KEHRER: Cit. Dieckmann and Wegner.
- (36) DELEE: Principles and Practice of Obstetrics, 1928: Page 107.
- (37) FEHLING: Arch. f. Gynak. 28: 453: 1896.
- (38) WILLIAMSON: Obstetrics: Textbook for Use of Students and Practitioners.
- (39) KÜHNEL: Ztschr. f. Geburtsh. u. Gynäk. 90: 511: 1927. [page 193.
- (40) DIECKMANN and WEGNER: Arch. Int. Med: 53: 188-207: Feb. 1934.
- (41) SMITH: 1. Anat. Rec. 45: 278: 1930.
2. Arch. Int. Med. 47: 206-229: Feb. 1931.
- (42) WARD: Am. J. Physiol. Bost.: 11: 394-403: 1904.
- (43) DREYER, BAZETT and PIERCE: Lancet: 2: 558-59: 1920.
- (44) MILLS: Arch. Int. Med: 35: 760: June, 1925.
- (45) RABINOVITCH: J. Lab. and Clin. Med: St. Louis: 9: 120-123: 1923.
- (46) SCHWINGE: Cit. Smith. (41).
- (47) DOAN and ZERFAS: J. Exp. Med: 46: 511: 1927.
- (48) PONDS and MILLAR: Quart. J. Exper. Physiol: 19: 145: 1928.
- (49) DOAN and SABIN: J. Exper. Med. 46: 315: 1927.
- (50) OLIVER: Lancet: 1903: ii: 940.
- (51) LEICHTENSTERN: Cit. Smith. (41).
- (52) LIPPENCOTT: J. Lab. and Clin. Med: 12: 679; 1927.
- (53) CHAMBERLAIN: Phillipine Journal of Science, 1911: vi: 440.
- (54) MALASSEZ: Arch. de Physiologie: 1877: 9: 32.
- (55) LEVINE: Arch. Phys. Therapy: 12: 389-400: July 1931.
- (56) LAURENS and MARGESSON: Cit. Levine. (55).
- (57) PLATT and FREEMAN: Cit. Sanford.
- (58) BALFOUR: Byam and Archibald's "The Practice of Medicine in the Tropics"
1921. Vol. I. Page 4.
- (59) TORGESSION: P. Ric. Jour. Pub. Health and Trop. Med: 5: 438.
- (60) SUAREZ: Cit. Pons.
- (61) PONS: Porto Rico J. Pub. Health and Trop. Med: 7: 203-208: Dec. 1931.
- (62) BOOTHBY and BERRY: Am. J. Physiol: 27: 1378: 1915.
- (63) ADAIR: Cit. Dieckmann and Wegner.
- (64) MOORE: Amm. J. Obst. and Gynec: 18: 424: 1929.
- (65) KERWEN and COLLINS: Amm. J. Med. Sc. 172: 548: 1926.
- (66) GALLOWAY: J.A.M.A. 93: 1695: 1929.
- (67) LYON: J.A.M.A. 92: 11: 1929.
- (68) SANFORD: Folia Haemat: 47: 478: 32.